

# KIC 006021275

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006021275-01	OBS	0284.02	6.414954	137.561375	119.7	3.530	39.2	42.3	1.10	5931	1.49	309.27
006021275-02	OBS	0284.01	18.010222	143.401176	179.4	3.695	33.8	36.5	1.10	5931	1.95	78.09
006021275-03	OBS	0284.03	6.178160	131.795419	99.2	3.323	33.6	36.5	1.10	5931	1.30	325.18
006021275-04	OBS	0284.04	110.286793	239.218122	122.8	4.362	10.0	10.9	1.10	5931	1.37	6.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006021275-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
006021275-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT
006021275-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006021275-04	OBS	PC	0.84	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

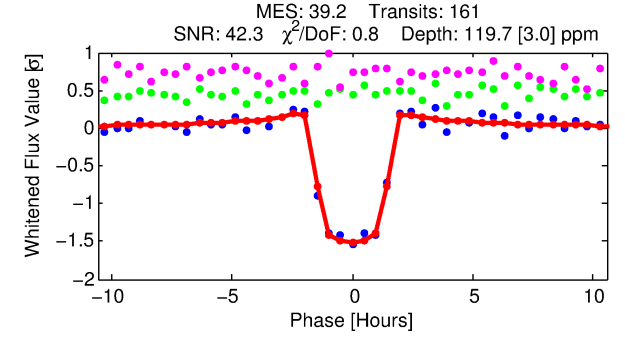
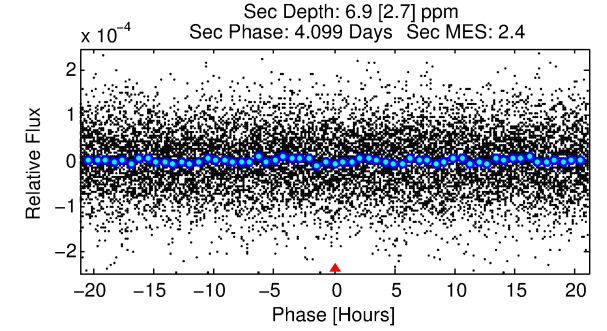
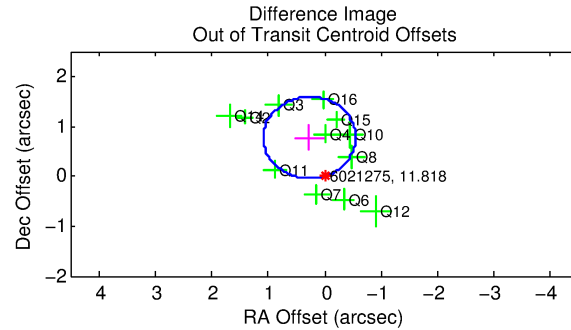
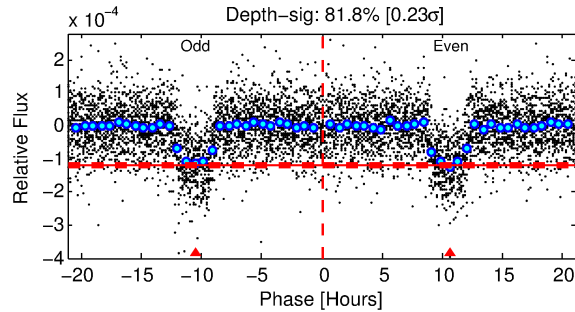
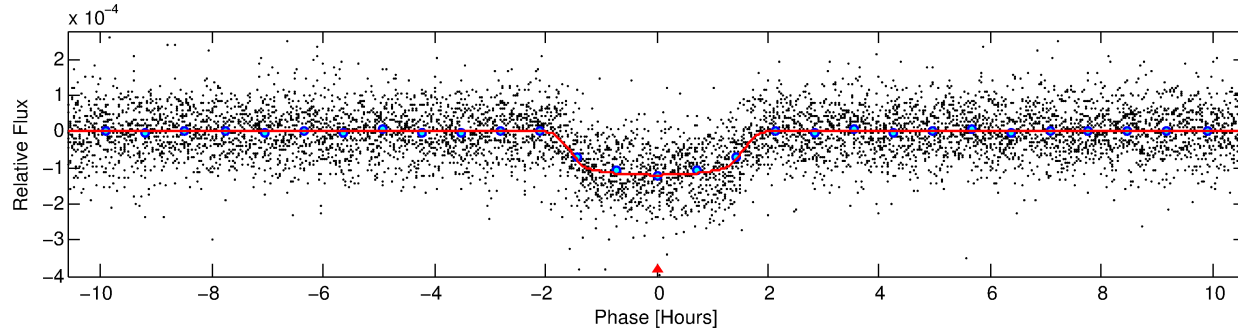
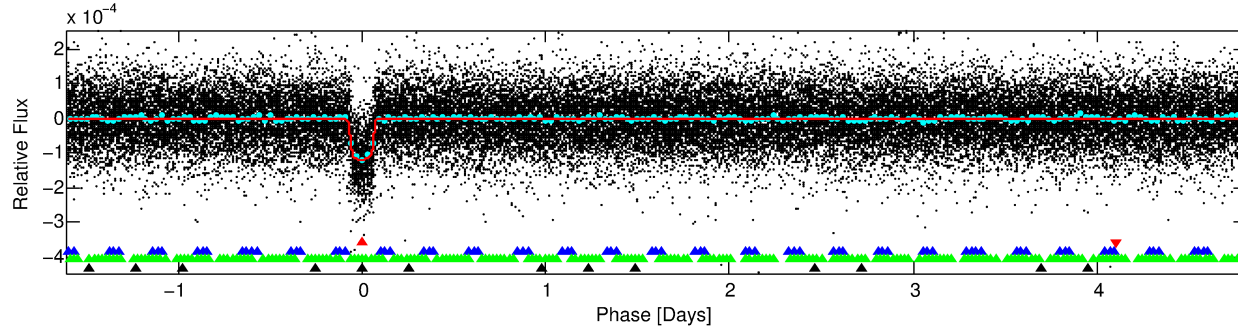
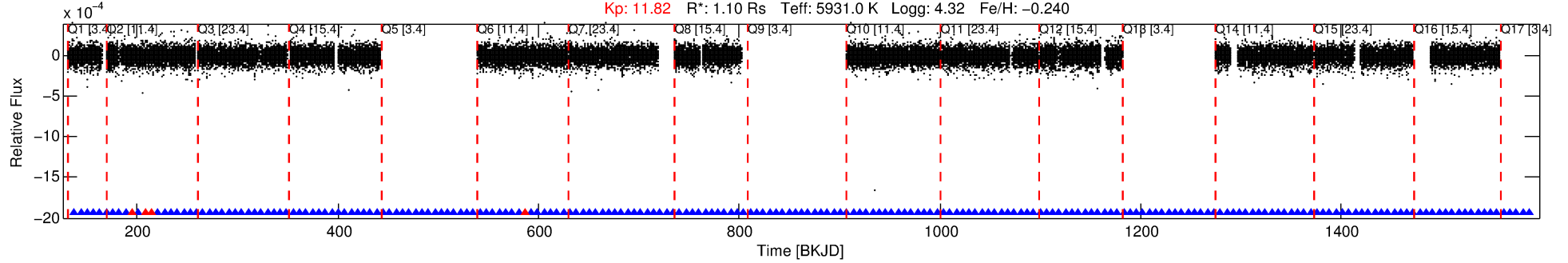
Ephemeris Match Information For 006021275-01

No Significant Match Found

# DV One-Page Summary

KIC: 6021275 Candidate: 1 of 4 Period: 6.415 d  
KOI: K00284.02 Name: Kepler-132c Corr: 0.969

Kp: 11.82 R\*: 1.10 Rs Teff: 5931.0 K Logg: 4.32 Fe/H: -0.240



## DV Fit Results:

Period = 6.41495 [0.00001] d  
Epoch = 137.5614 [0.0013] BKJD  
Rp/R\* = 0.0124 [0.0007]  
a/R\* = 5.23 [1.49]  
b = 0.94 [0.04]  
Seff = 309.27 [76.72]  
Teq = 1069 [66] K  
Rp = 1.49 [0.25] Re  
a = 0.0659 [0.0098] AU  
Ag = 7.42 [3.45] [1.86σ]  
Teffp = 2729 [279] K [5.79σ]

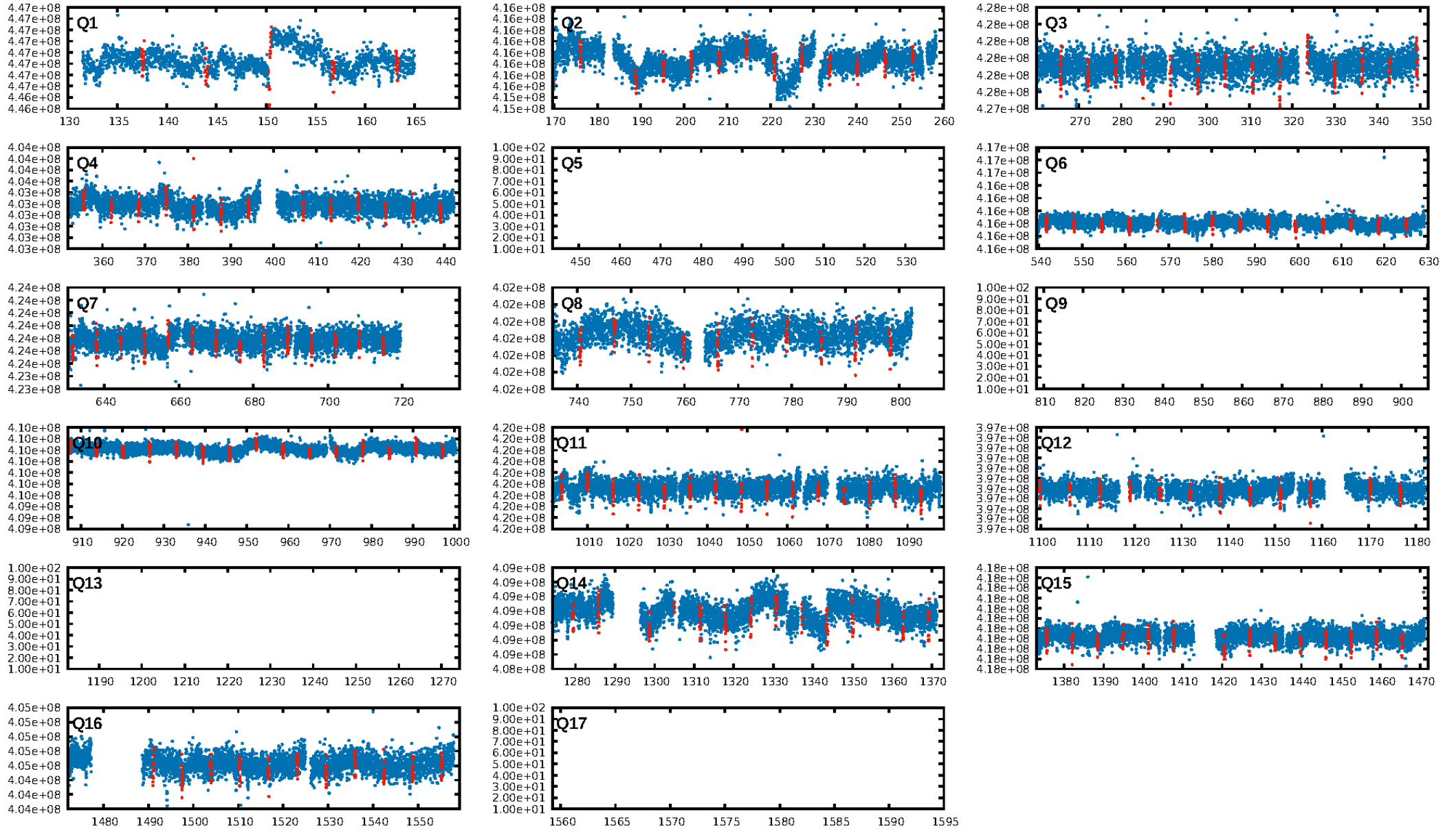
## DV Diagnostic Results:

ShortPeriod-sig: 75.9% [1.17σ]  
LongPeriod-sig: 100.0% [54.46σ]  
ModelChiSquare2-sig: 99.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.97 [152/156]  
GhostDiagnostic-chr: 10.01  
Centroid-sig: 0.0%  
Centroid-so: 0.826 arcsec [2.89σ]  
OotOffset-rm: 0.817 arcsec [3.00σ]  
KicOffset-rm: 0.751 arcsec [3.17σ]  
OotOffset-st: 4/4/4/0 [12]  
KicOffset-st: 4/4/4/0 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [13/13]

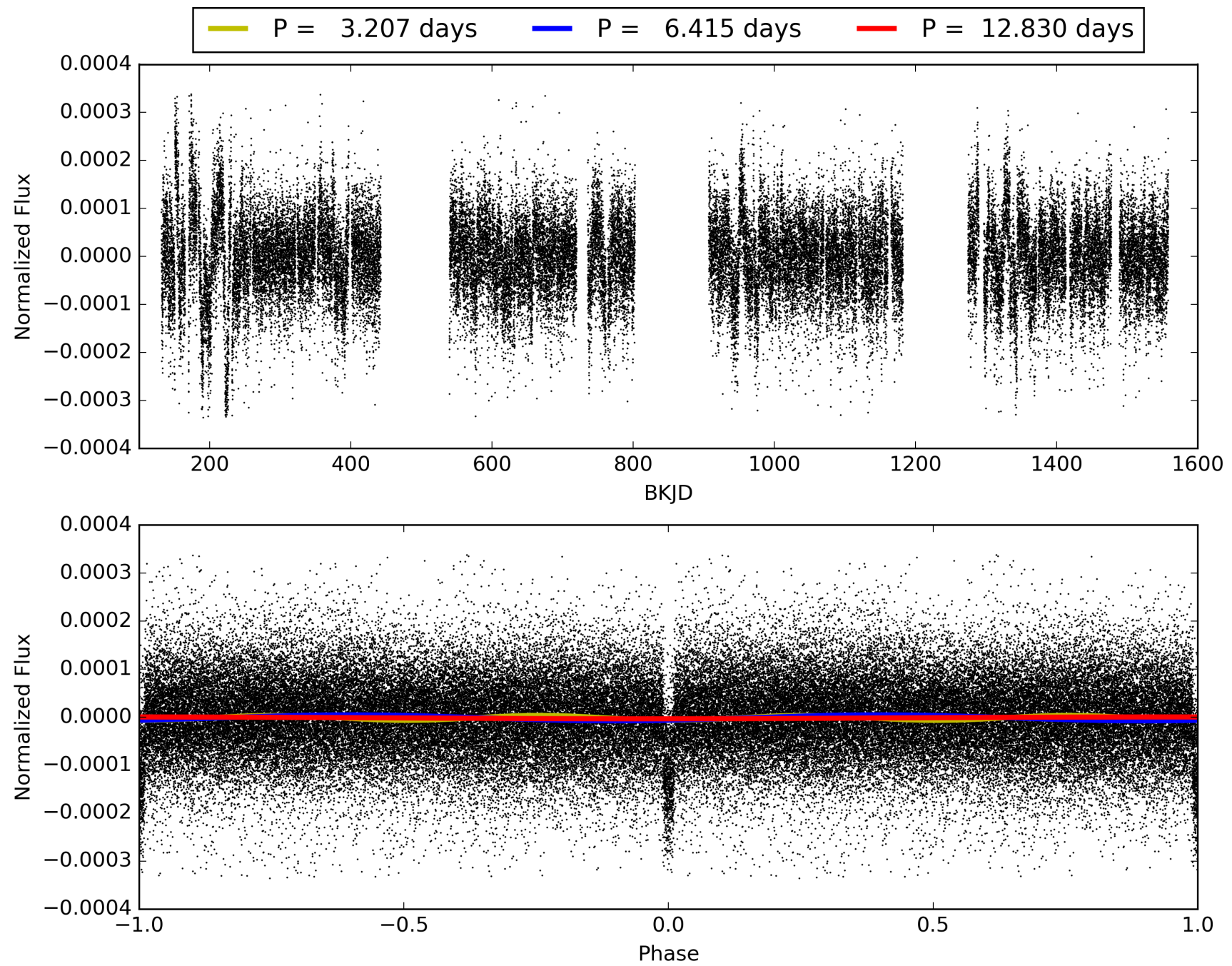
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 14:10:17 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006021275-01, PDC Light Curves



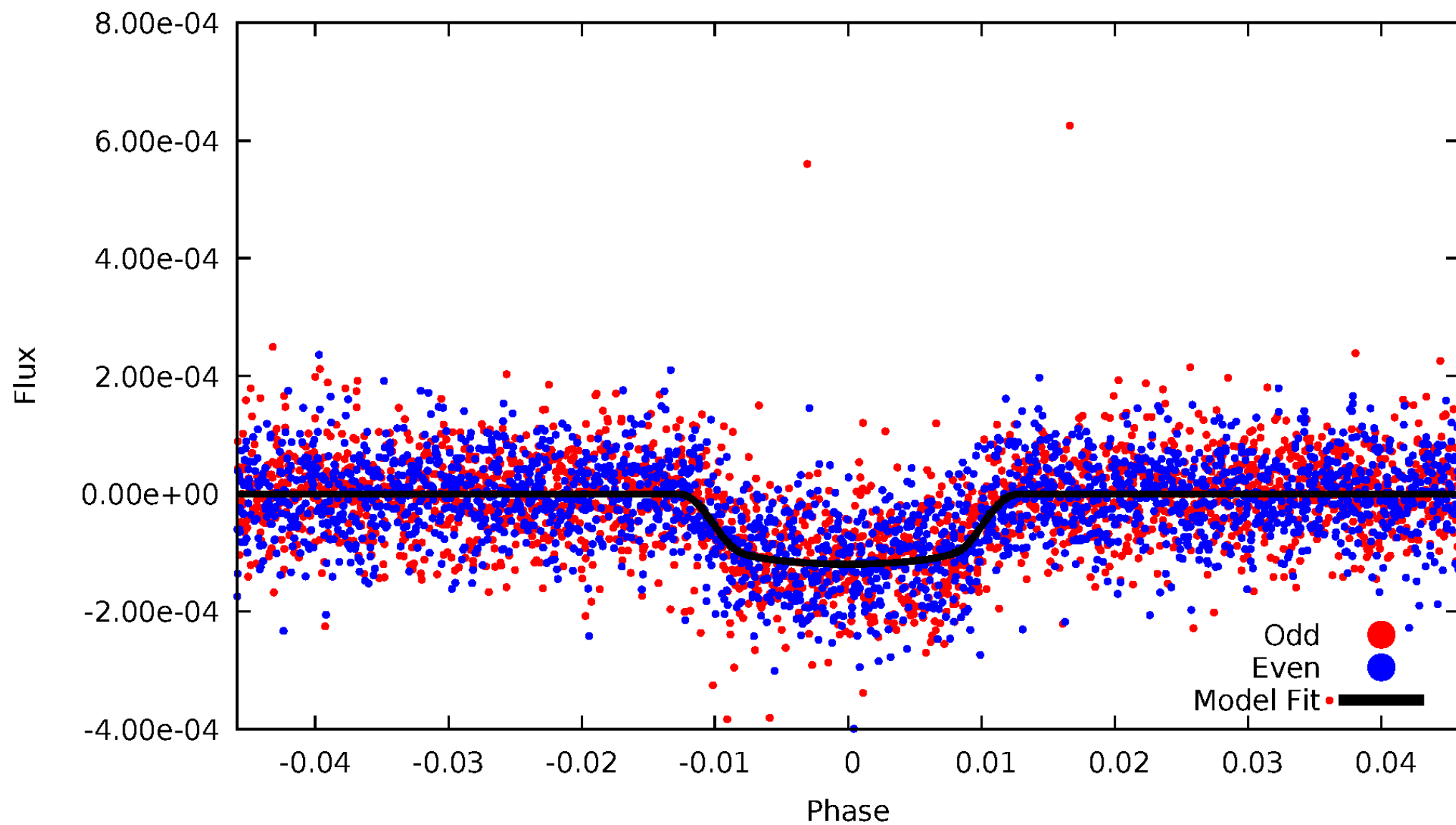
TCE 006021275-01





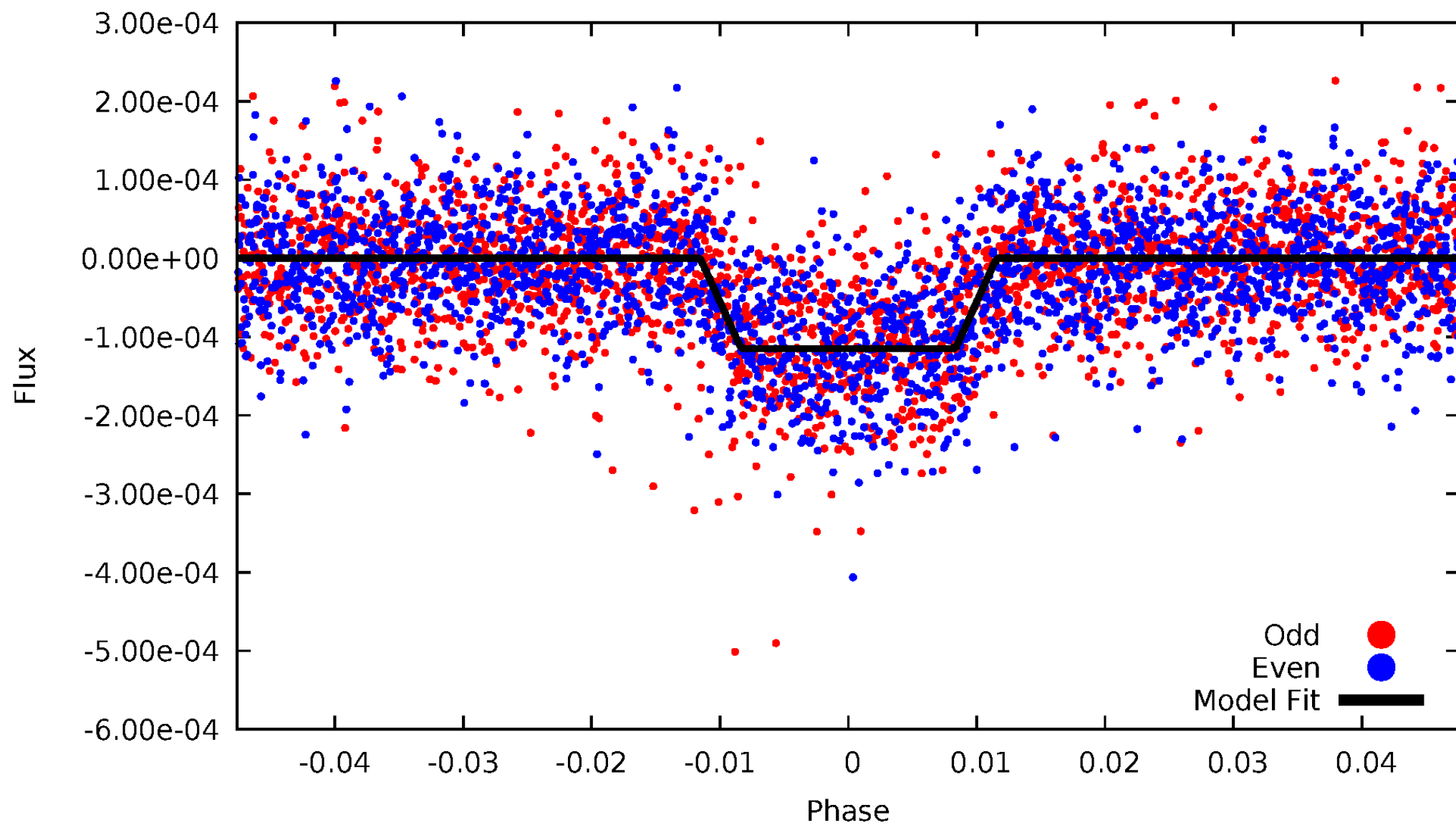
# DV Odd/Even

TCE 006021275-01



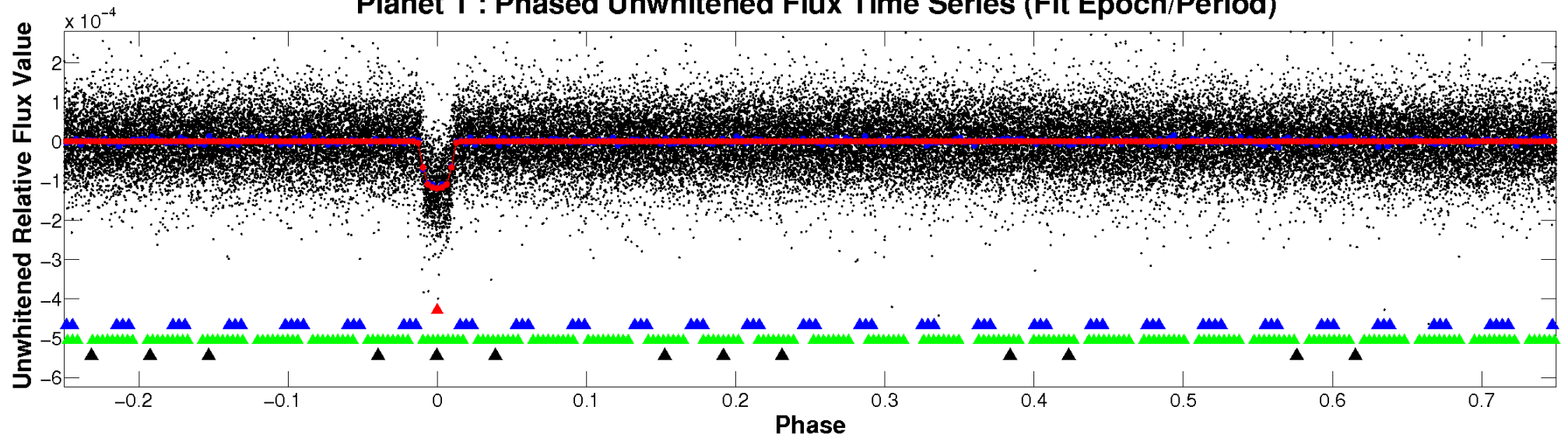
# ALT Odd/Even

TCE 006021275-01

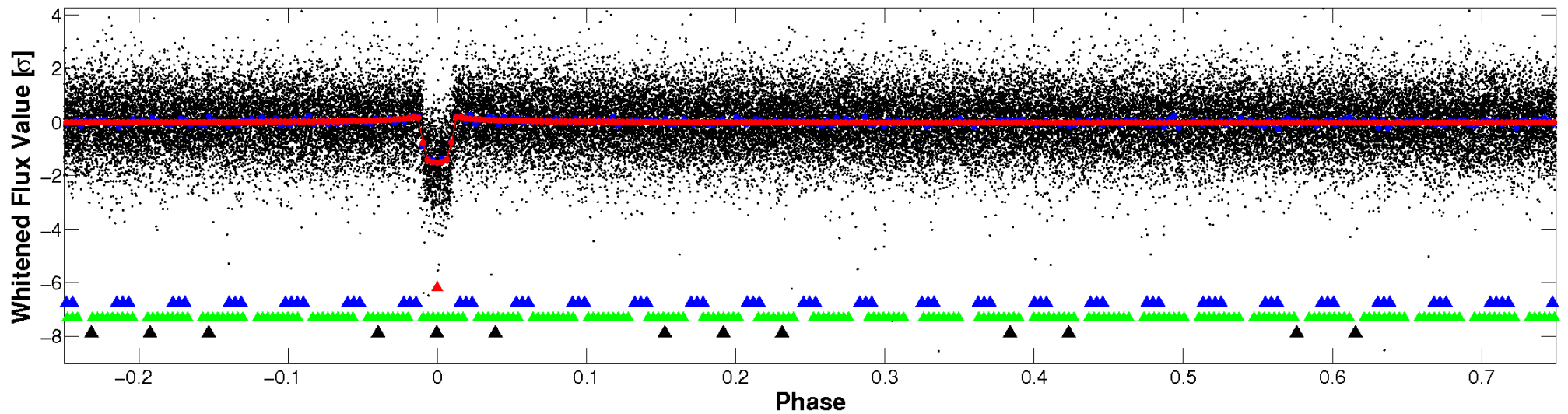


# Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

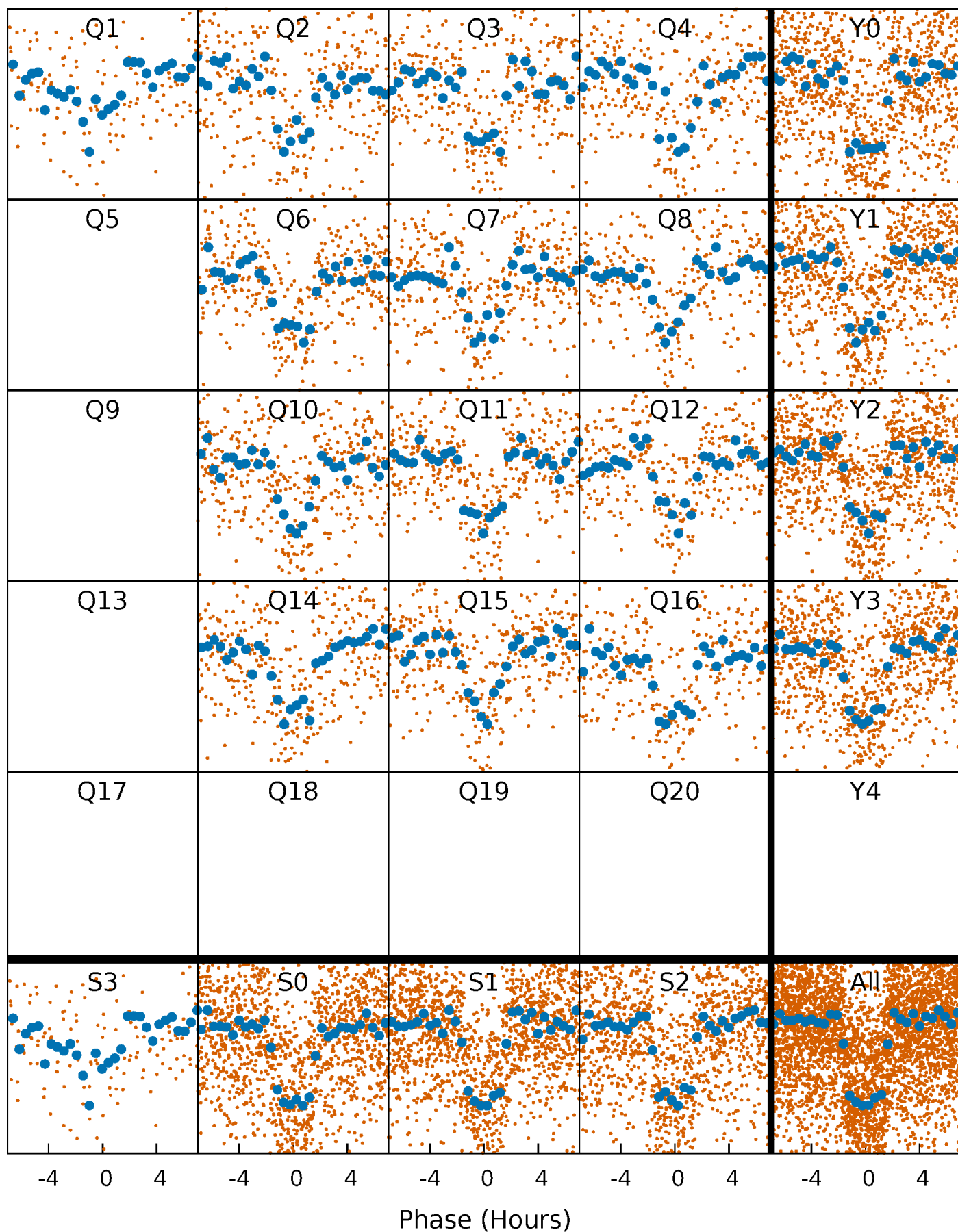


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

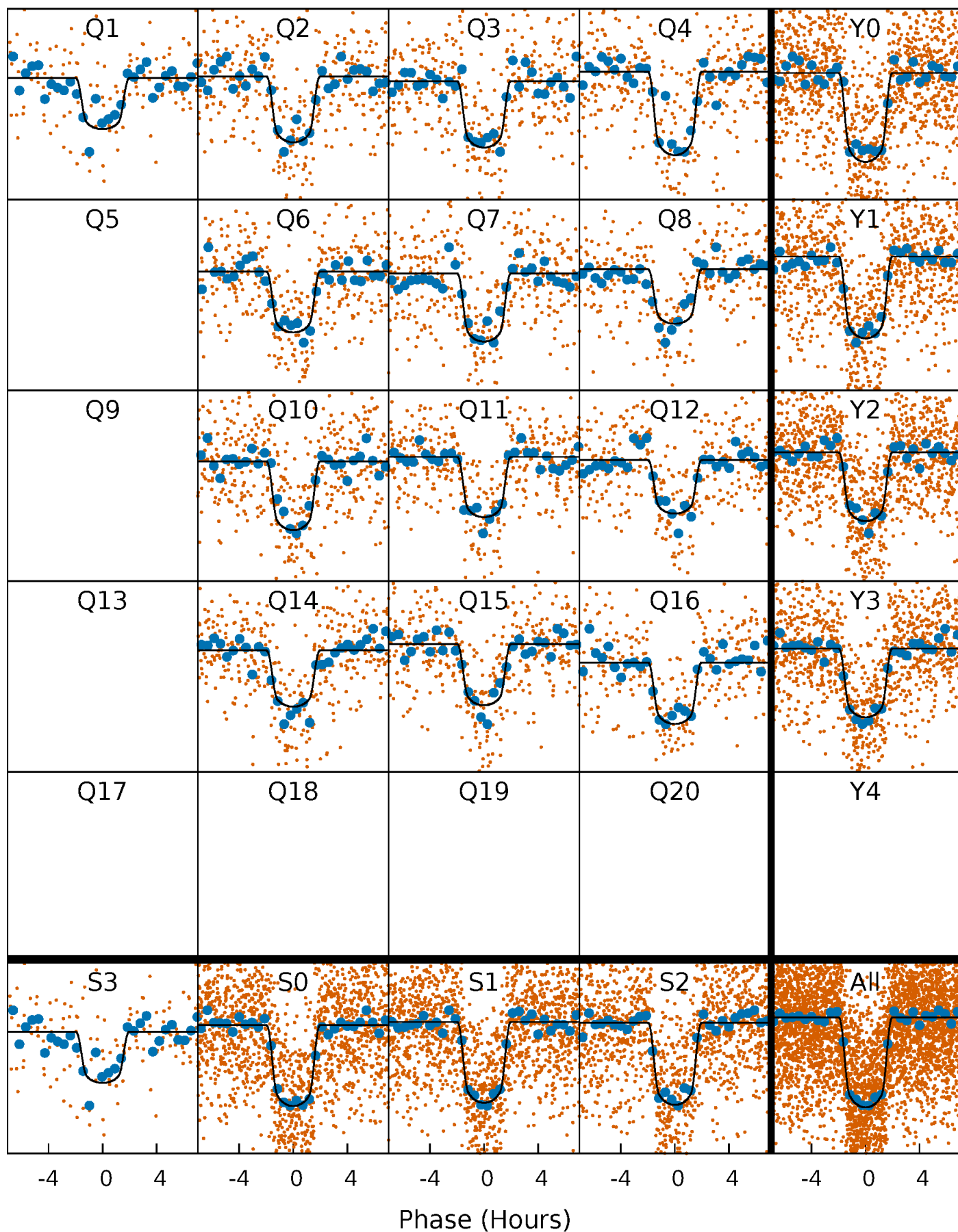
TCE 006021275-01   P= 6.414954 Days    $T_0=137.561375$  (BKJD)





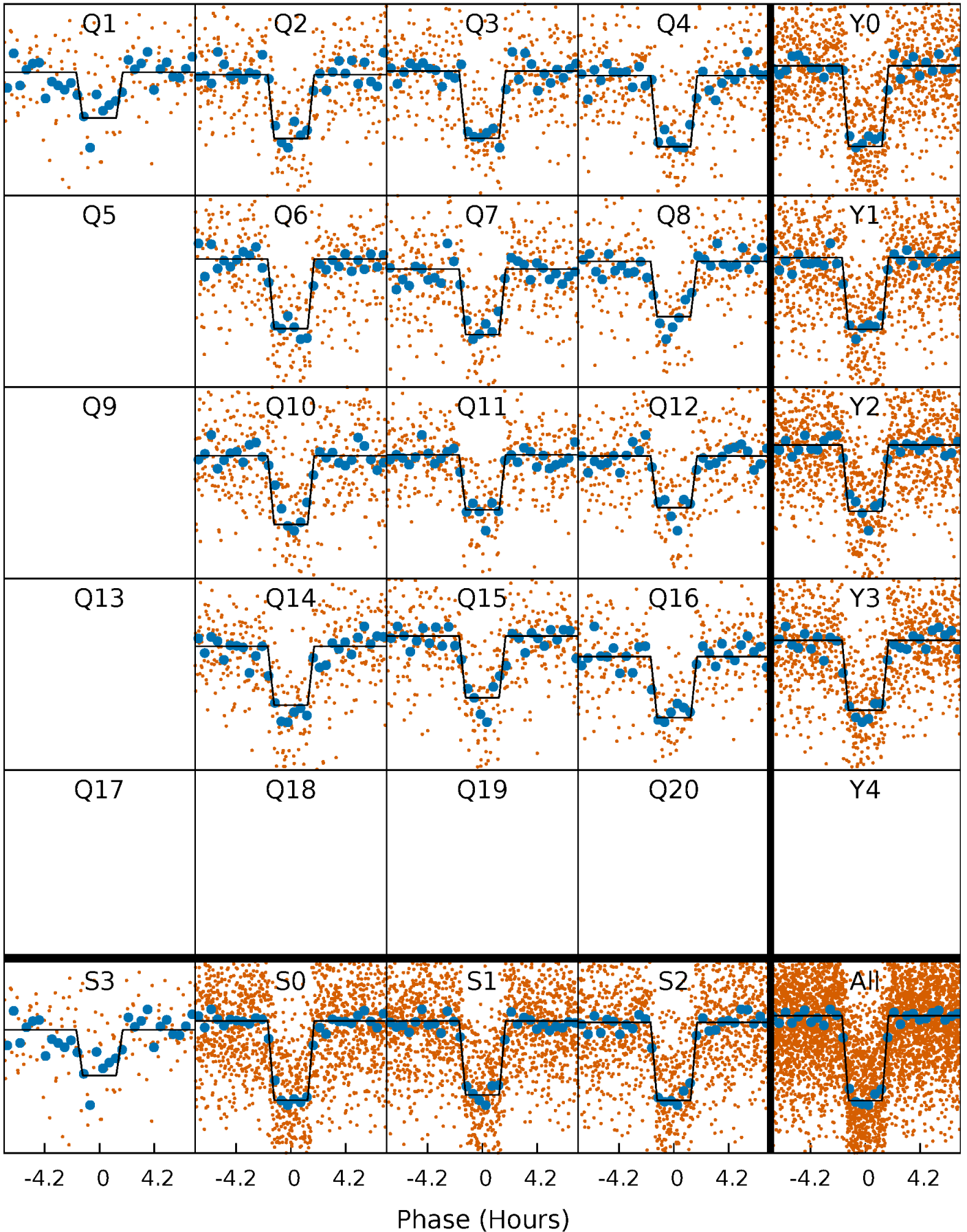
# DV Quarter-Phased Transit Curves

TCE 006021275-01 P= 6.414954 Days  $T_0=137.561375$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

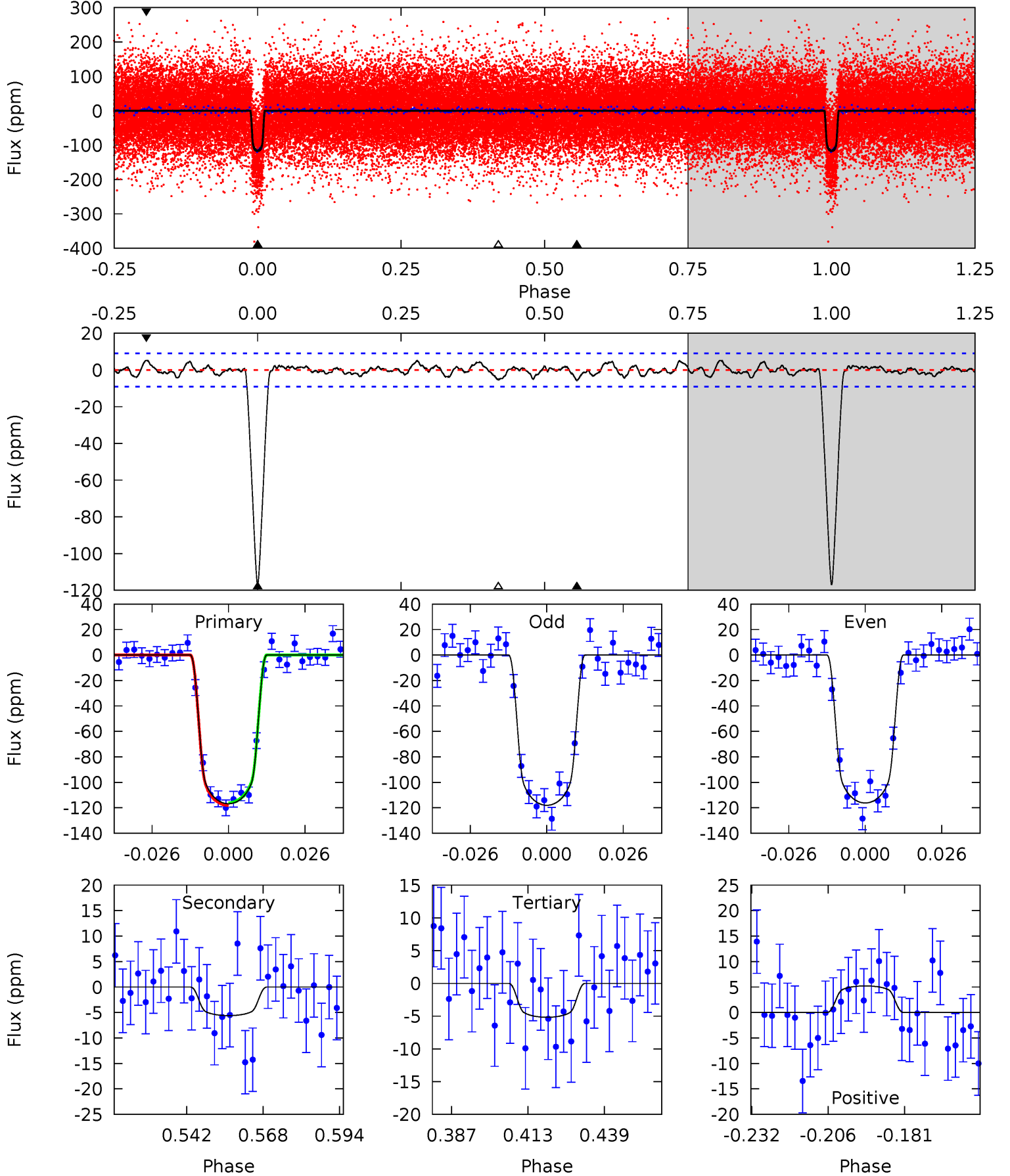
TCE 006021275-01 P= 6.414968 Days  $T_0=137.559645$  (BKJD)



# DV Model-Shift Uniqueness Test

006021275-01, P = 6.414954 Days, E = 131.146421 Days

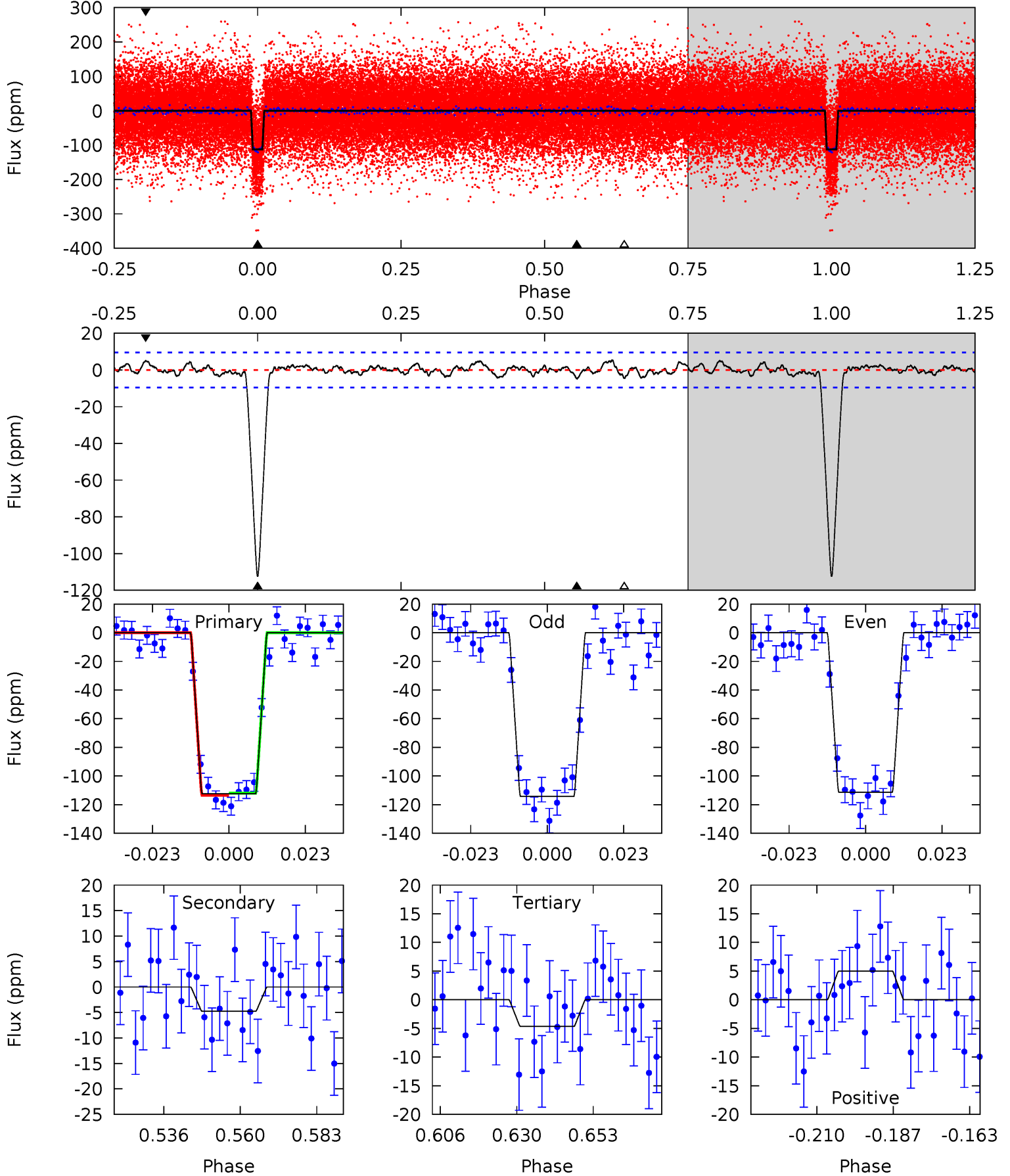
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
62.4	3.00	2.76	2.79	4.84	2.23	1.12	59.6	59.6	0.23	0.21	0.48	0.99	0.04	0.54



# Alt Model-Shift Uniqueness Test

006021275-01, P = 6.414968 Days, E = 131.144677 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
57.3	2.43	2.37	2.55	4.86	2.27	1.02	54.9	54.7	0.06	-0.12	0.75	0.99	0.05	0.38





### Stellar Parameters For KIC 006021275

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5931^{+107}_{-118}$	$4.322^{+0.137}_{-0.112}$	$-0.240^{+0.150}_{-0.150}$	$1.101^{+0.157}_{-0.173}$	$0.929^{+0.066}_{-0.066}$	$0.980^{+0.606}_{-0.319}$
	+2%/-2%	+3%/-3%	+62%/-62%	+14%/-16%	+7%/-7%	+62%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006021275-01 / KOI 0284.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-6 \pm 2$	$1.49^{+0.15}_{-0.15}$	$1493^{+71}_{-73}$	$3160^{+165}_{-197}$	$6.080^{+2.397}_{-2.226}$
Alt.	$-5 \pm 2$	$1.29^{+0.15}_{-0.14}$	$1493^{+66}_{-72}$	$3223^{+192}_{-247}$	$6.776^{+3.385}_{-2.948}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

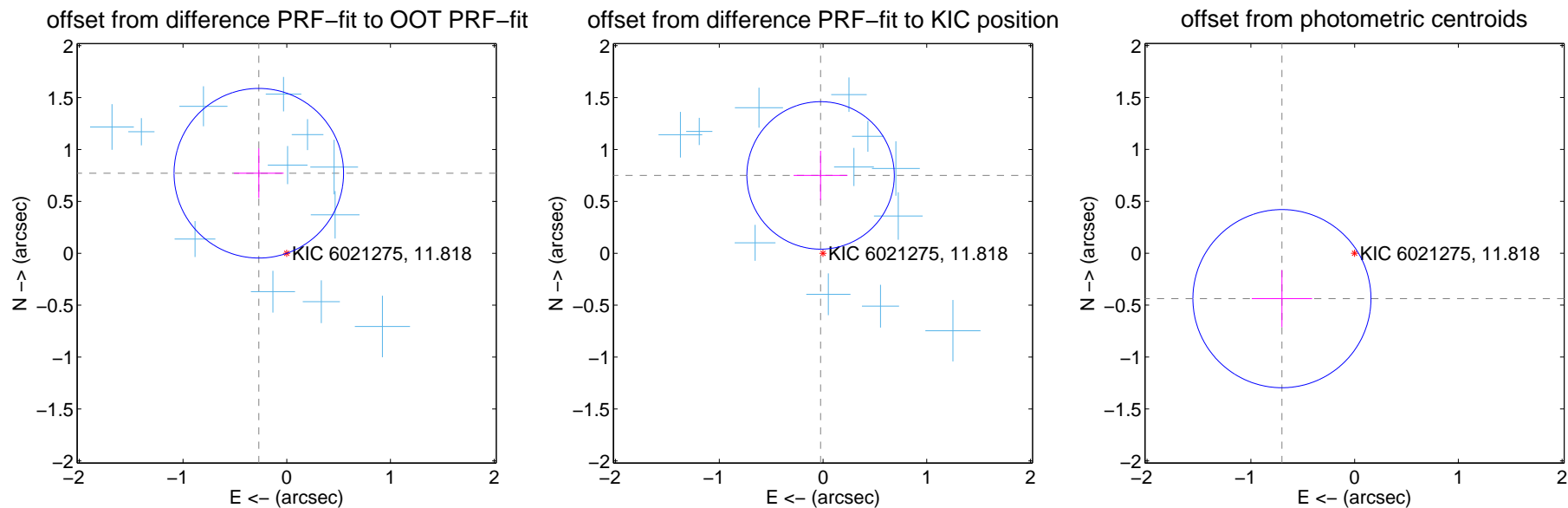
## DV Centroid Data

Supplemental centroid analysis for 006021275-01. **Kepler magnitude: 11.82.** Transit SNR 42.30

There are 12 quarters with good PRF difference image offsets

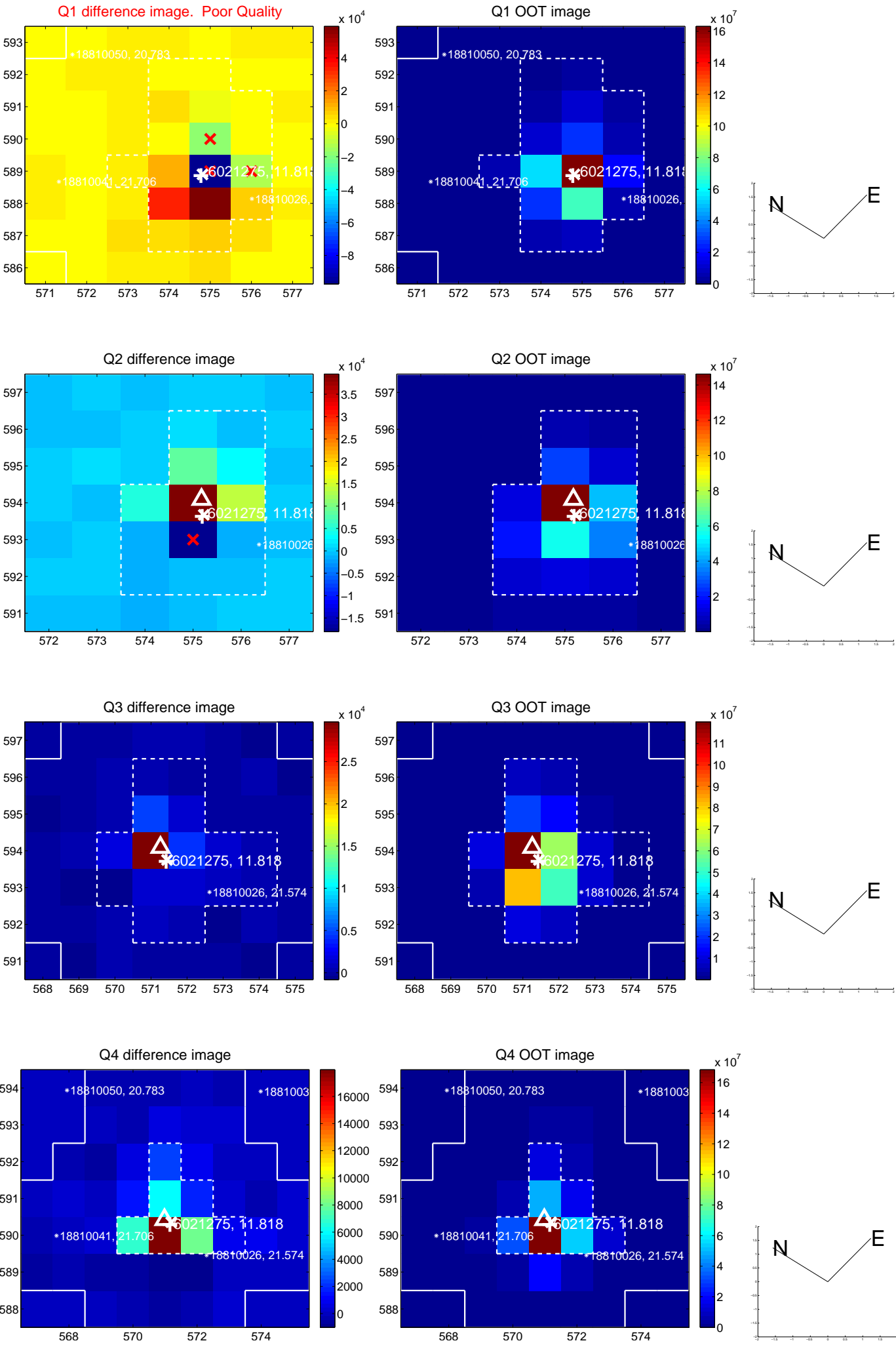
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.817 \pm 0.272$	3.00	$0.269 \pm 0.239$	$0.771 \pm 0.239$
PRF-fit source offset from KIC position	<b><math>0.751 \pm 0.237</math></b>	<b>3.17</b>	$0.024 \pm 0.260$	$0.750 \pm 0.237$
photometric centroid source offset	$0.83 \pm 0.29$	2.89	$0.70 \pm 0.29$	$-0.44 \pm 0.27$

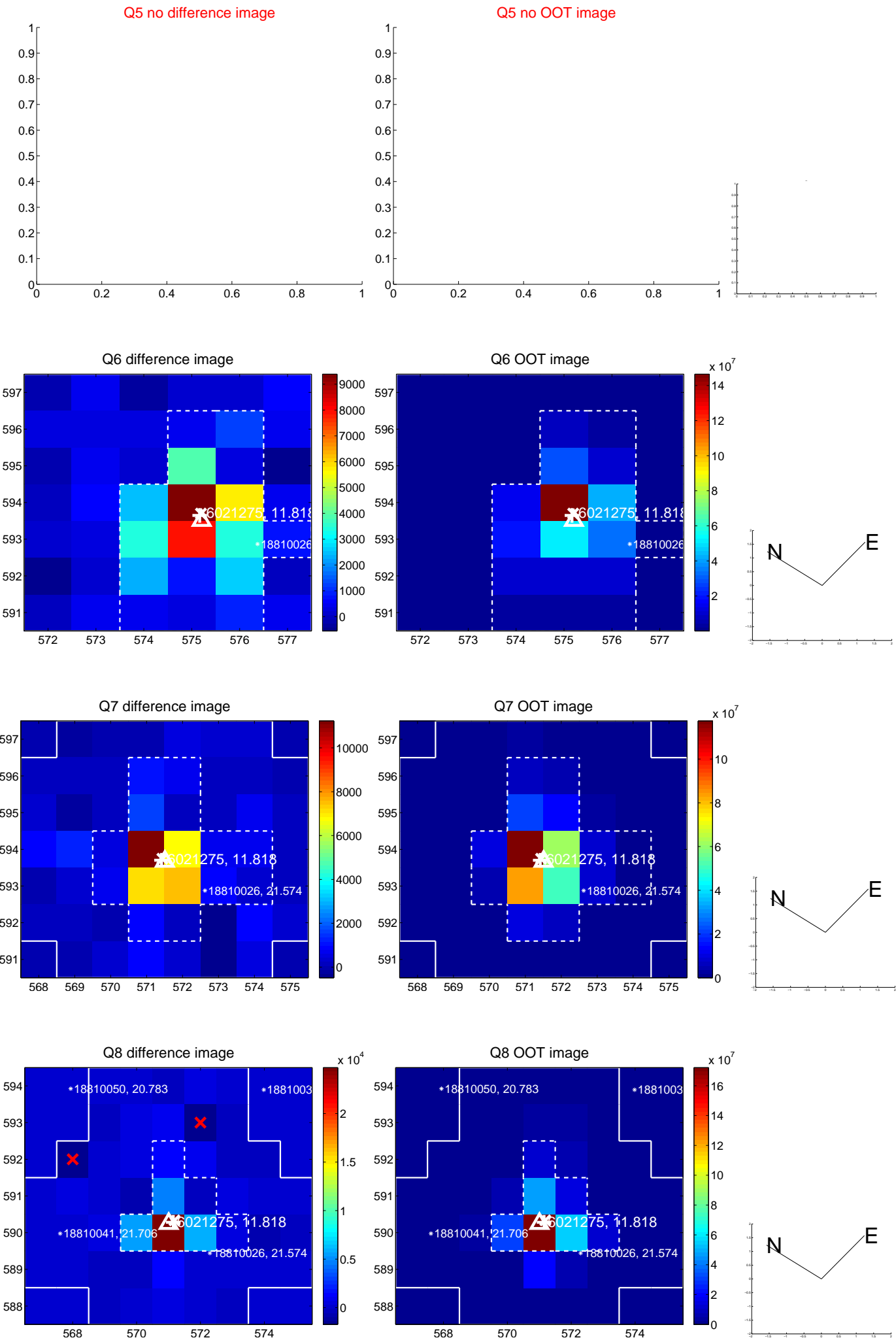


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

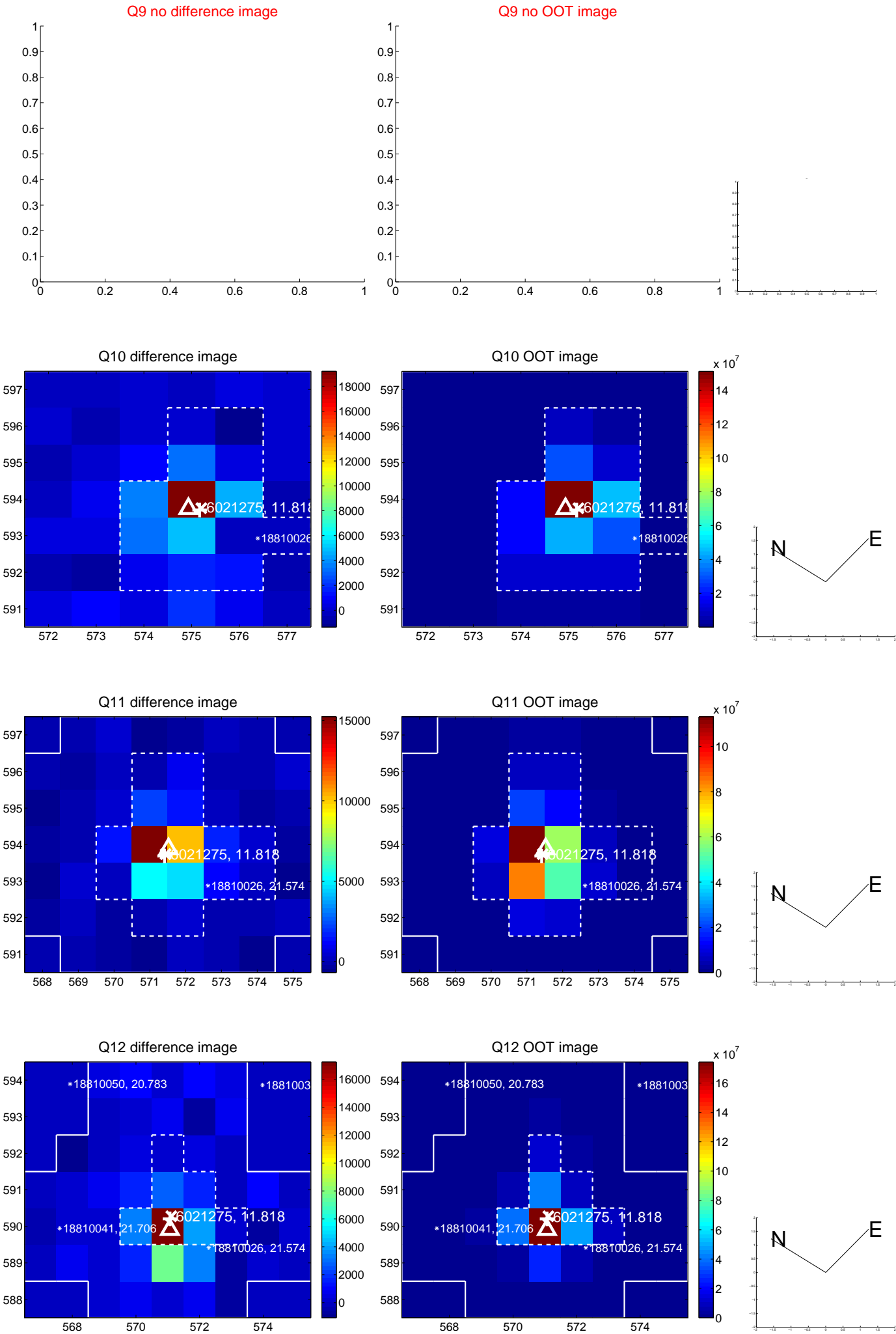


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

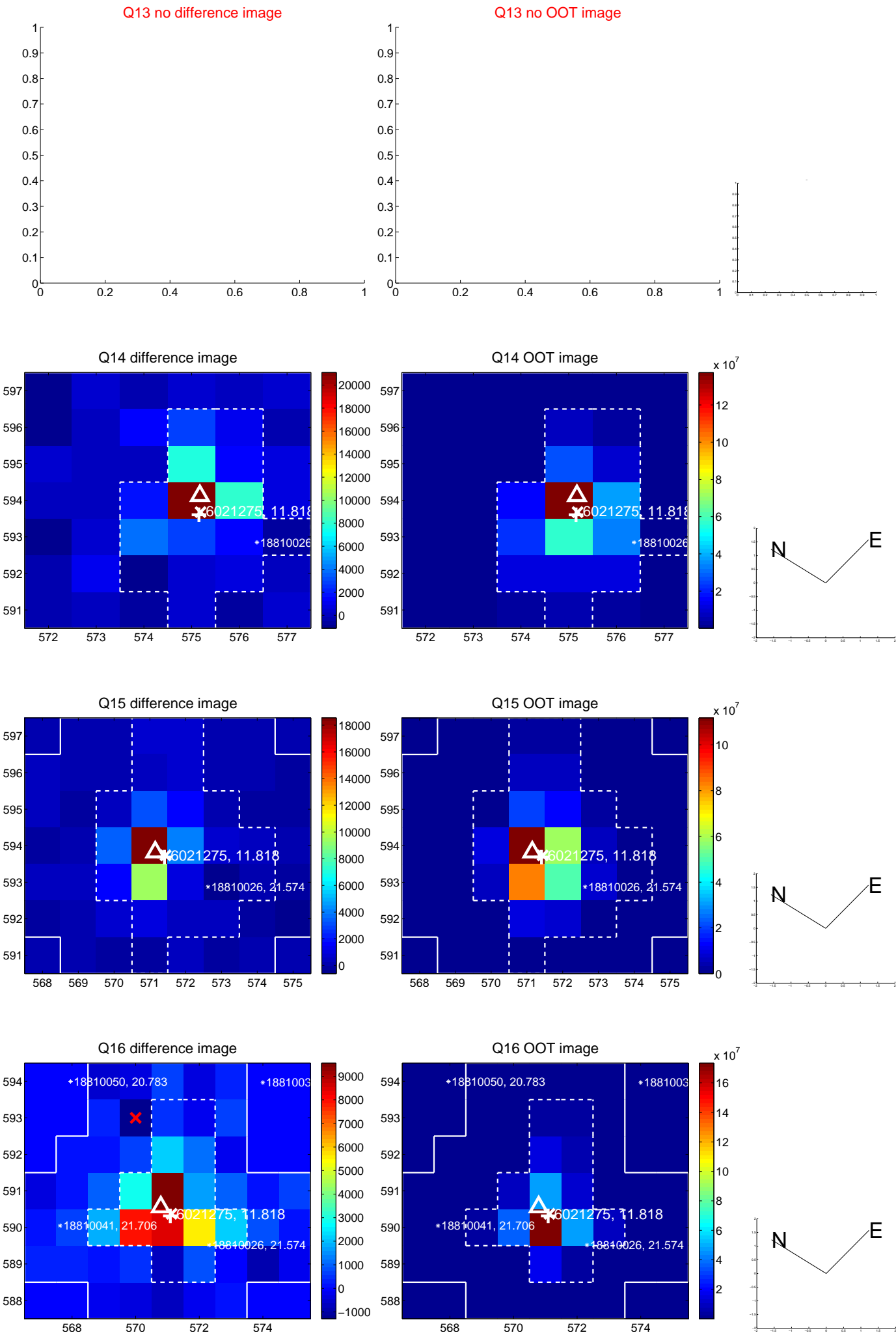




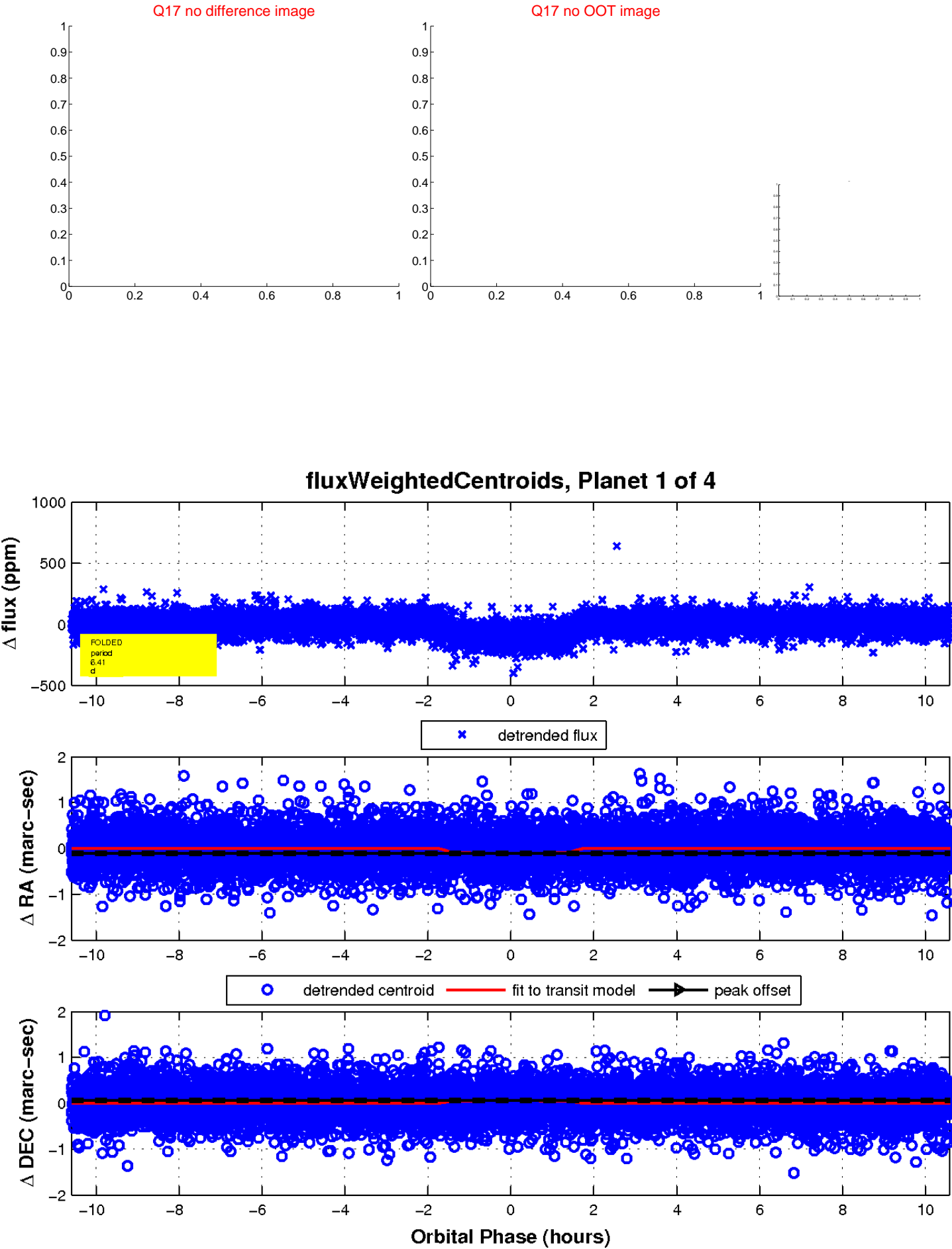
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

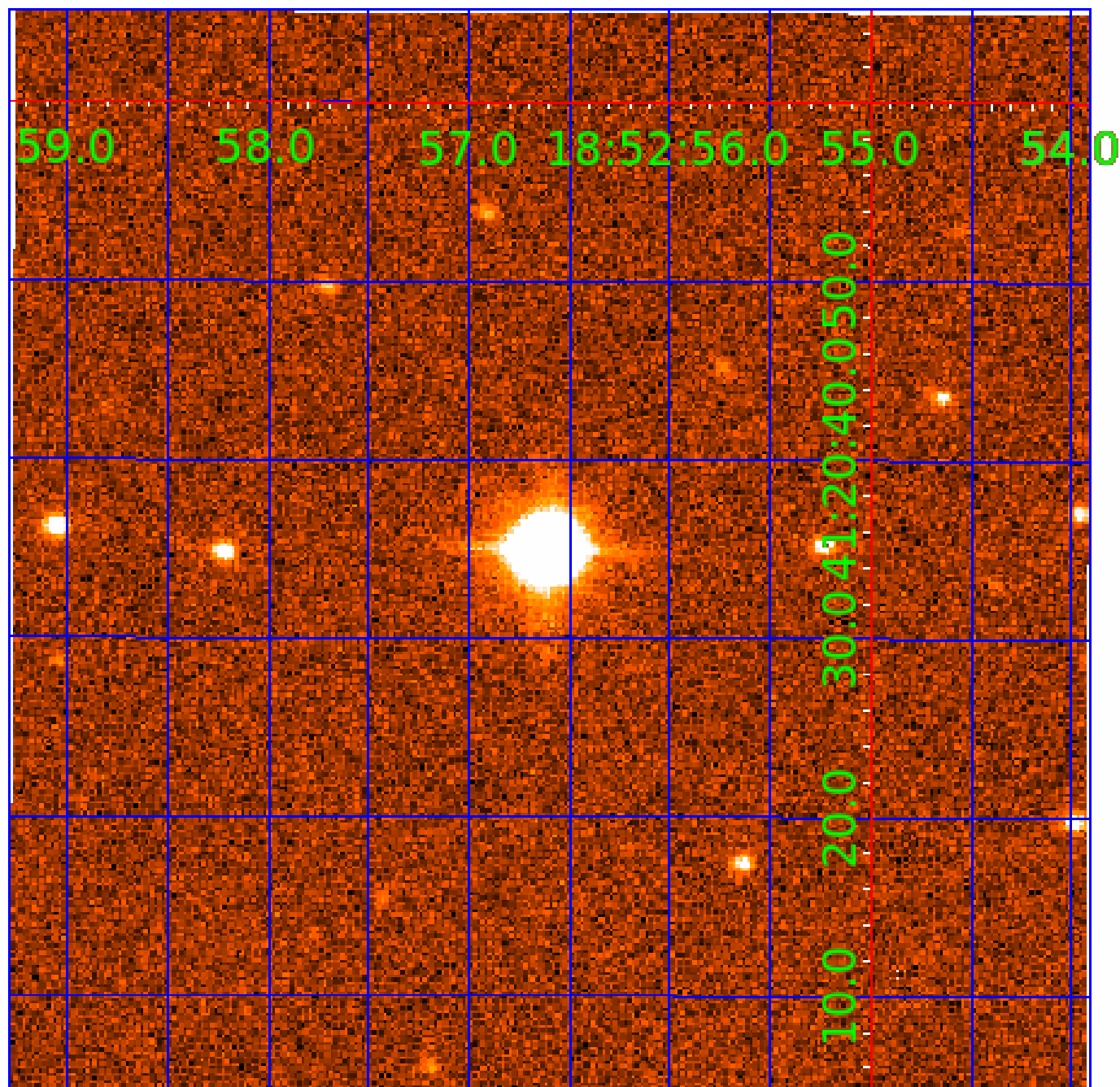


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006021275

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006021275-01	OBS	0284.02	6.414954	137.561375	119.7	3.530	39.2	42.3	1.10	5931	1.49	309.27
006021275-02	OBS	0284.01	18.010222	143.401176	179.4	3.695	33.8	36.5	1.10	5931	1.95	78.09
006021275-03	OBS	0284.03	6.178160	131.795419	99.2	3.323	33.6	36.5	1.10	5931	1.30	325.18
006021275-04	OBS	0284.04	110.286793	239.218122	122.8	4.362	10.0	10.9	1.10	5931	1.37	6.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006021275-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
006021275-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT
006021275-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006021275-04	OBS	PC	0.84	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

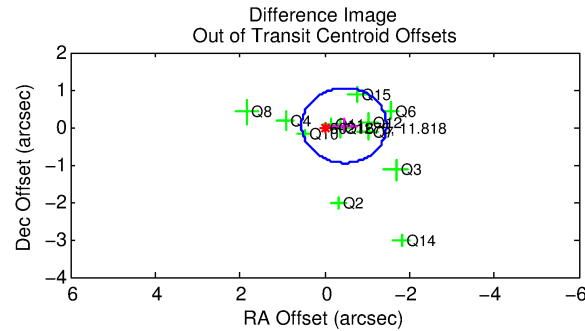
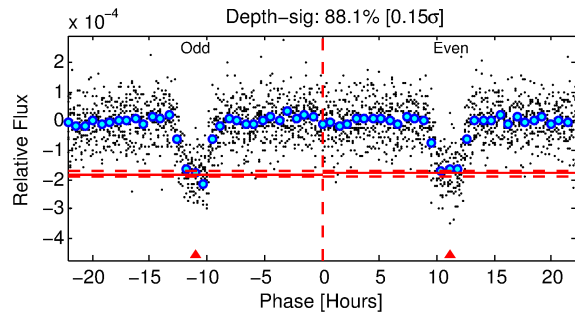
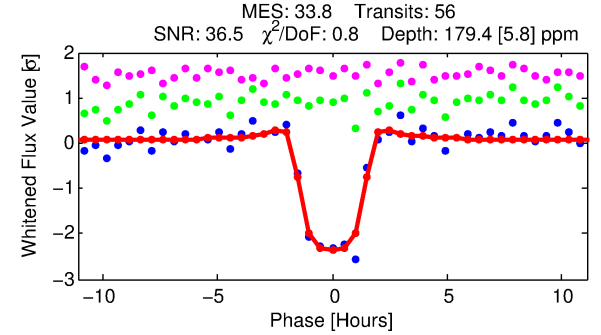
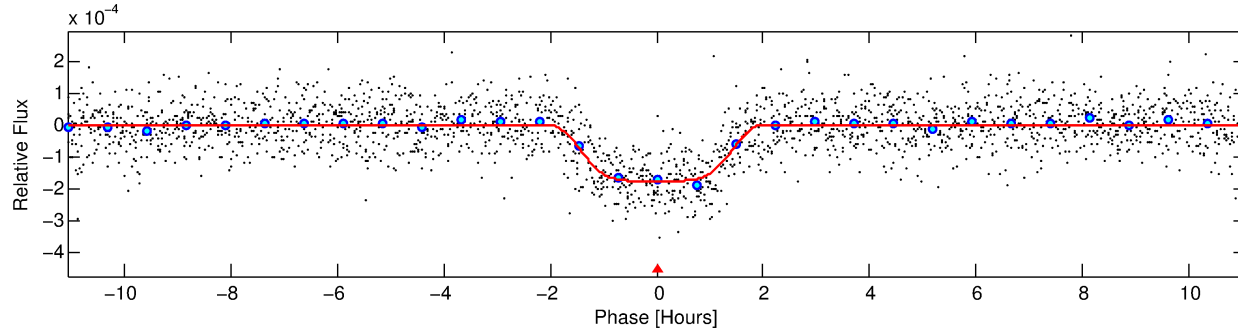
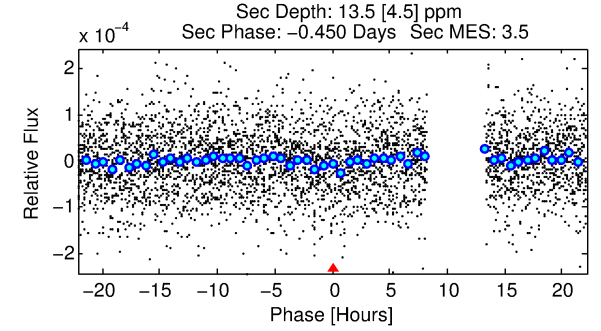
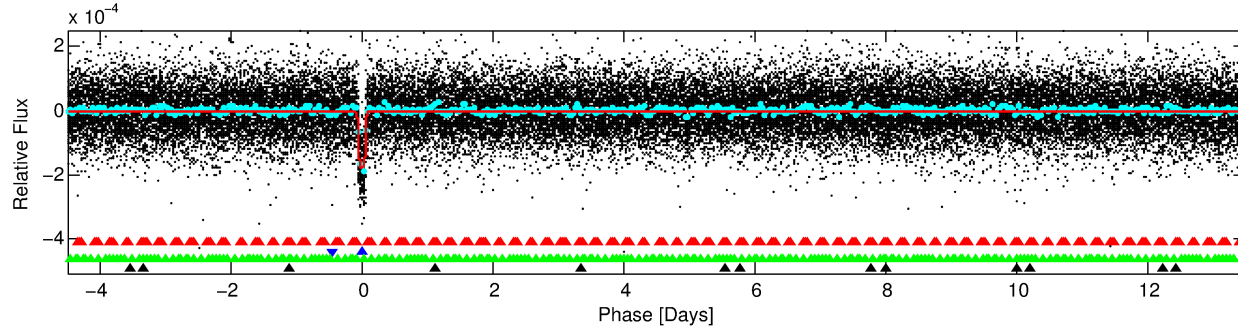
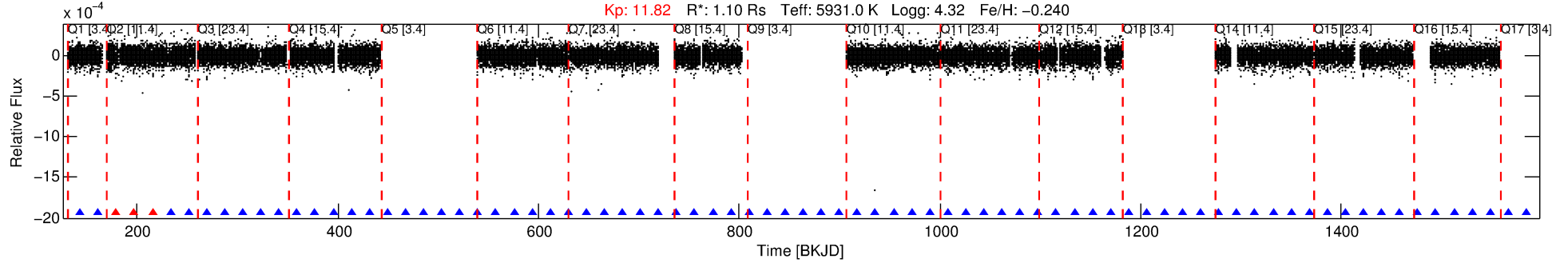
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006021275-02

No Significant Match Found

# DV One-Page Summary

KIC: 6021275 Candidate: 2 of 4 Period: 18.010 d  
KOI: K00284.01 Name: Kepler-132d Corr: 0.894



## DV Fit Results:

Period = 18.01022 [0.00005] d  
Epoch = 143.4012 [0.0021] BKJD  
Rp/R\* = 0.0162 [0.0004]  
a/R\* = 11.02 [0.99]  
b = 0.97 [0.01]  
Seff = 78.09 [19.37]  
Teq = 758 [47] K  
Rp = 1.95 [0.31] Re  
a = 0.1312 [0.0195] AU  
Ag = 33.66 [13.77] [2.37σ]  
Teffp = 2823 [243] K [8.34σ]

## DV Diagnostic Results:

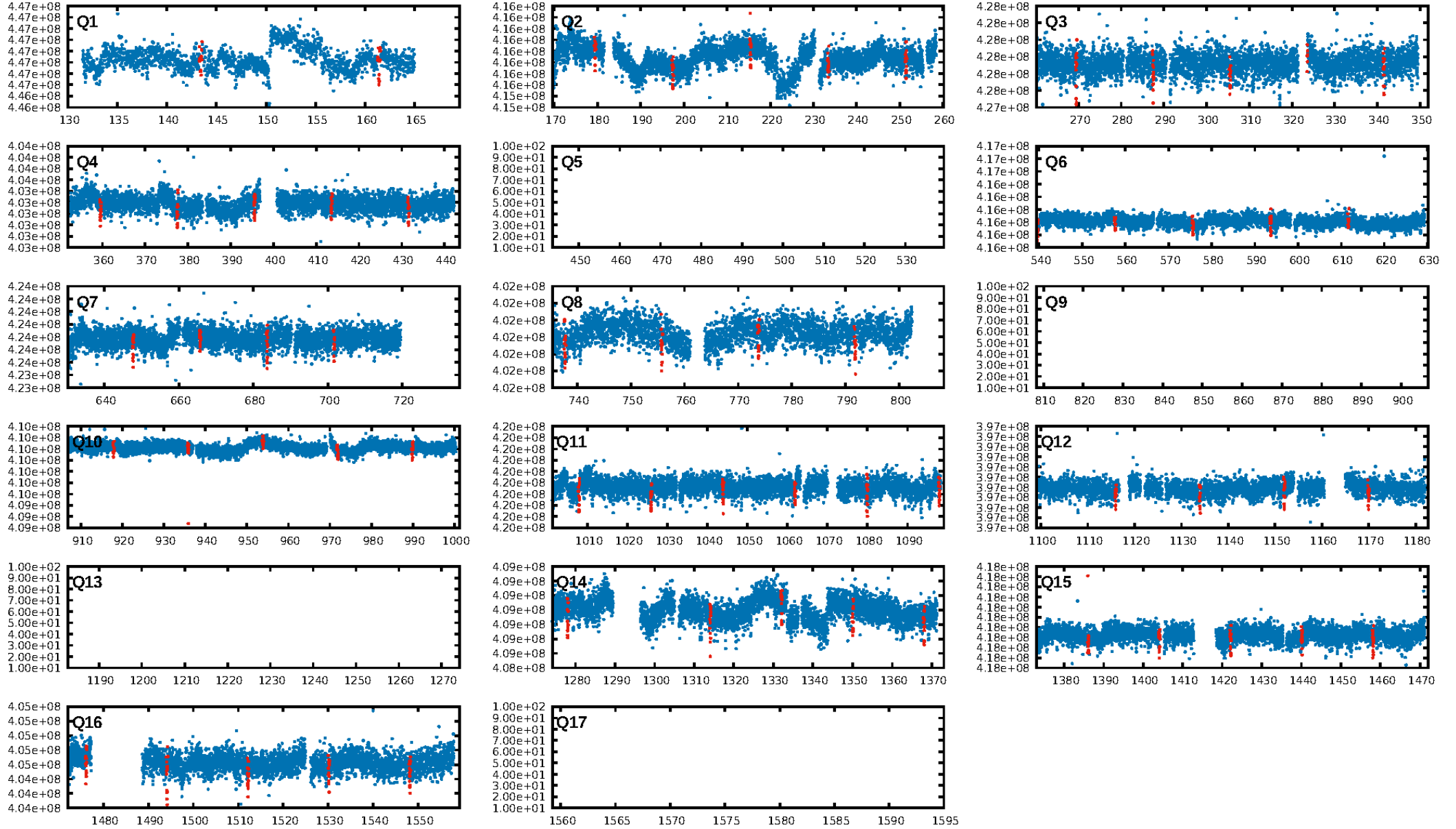
ShortPeriod-sig: 100.0% [54.46σ]  
LongPeriod-sig: 100.0% [387.43σ]  
ModelChiSquare2-sig: 26.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.10e-229  
RollingBand-fgt: 0.94 [51/54]  
GhostDiagnostic-chr: 33.08  
Centroid-sig: 51.8%  
Centroid-so: 0.261 arcsec [0.81σ]  
OotOffset-rm: 0.461 arcsec [1.38σ]  
KicOffset-rm: 0.697 arcsec [2.09σ]  
OotOffset-st: 4/4/4/0 [12]  
KicOffset-st: 4/4/4/0 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [13/13]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 14:10:23 Z

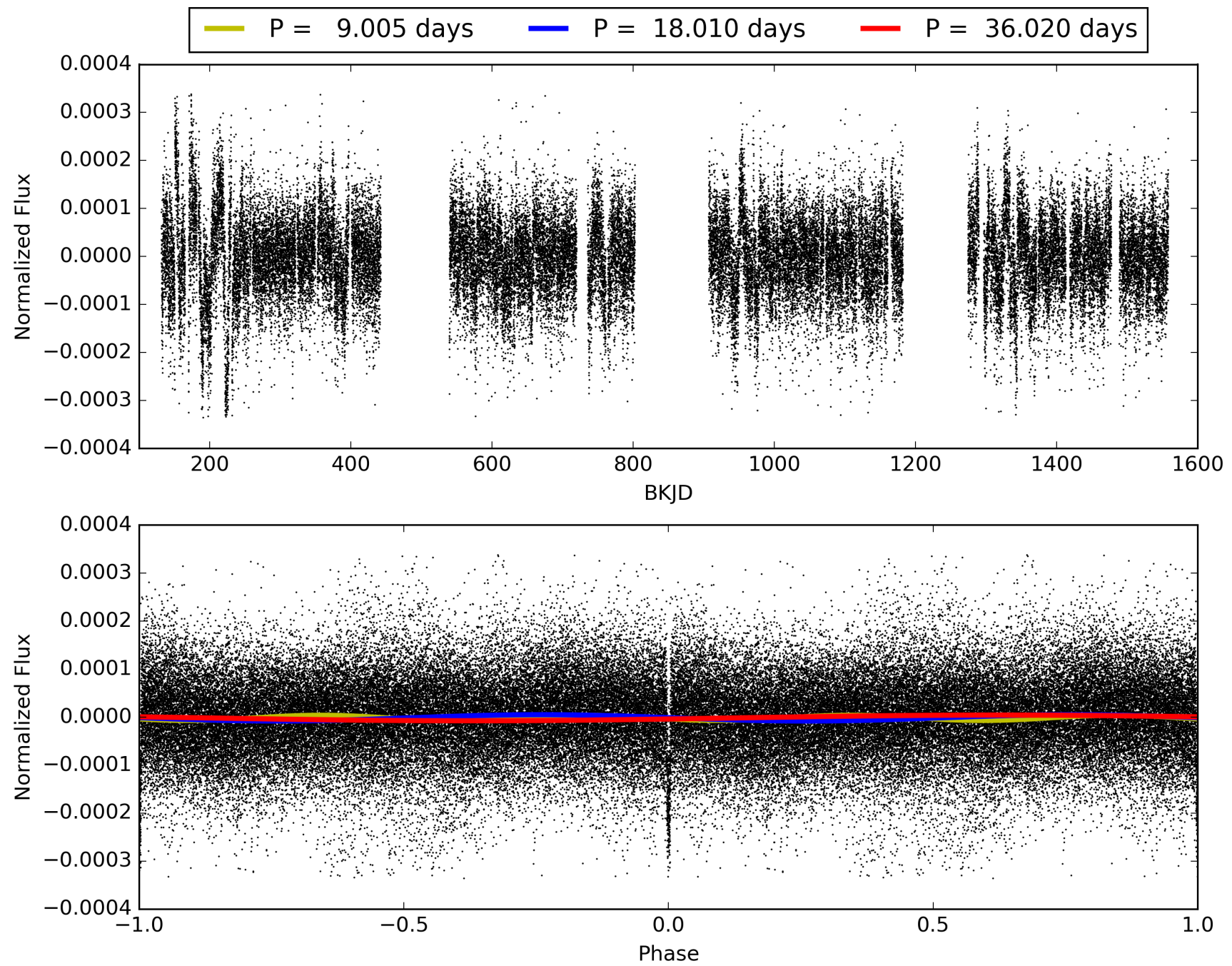
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006021275-02, PDC Light Curves

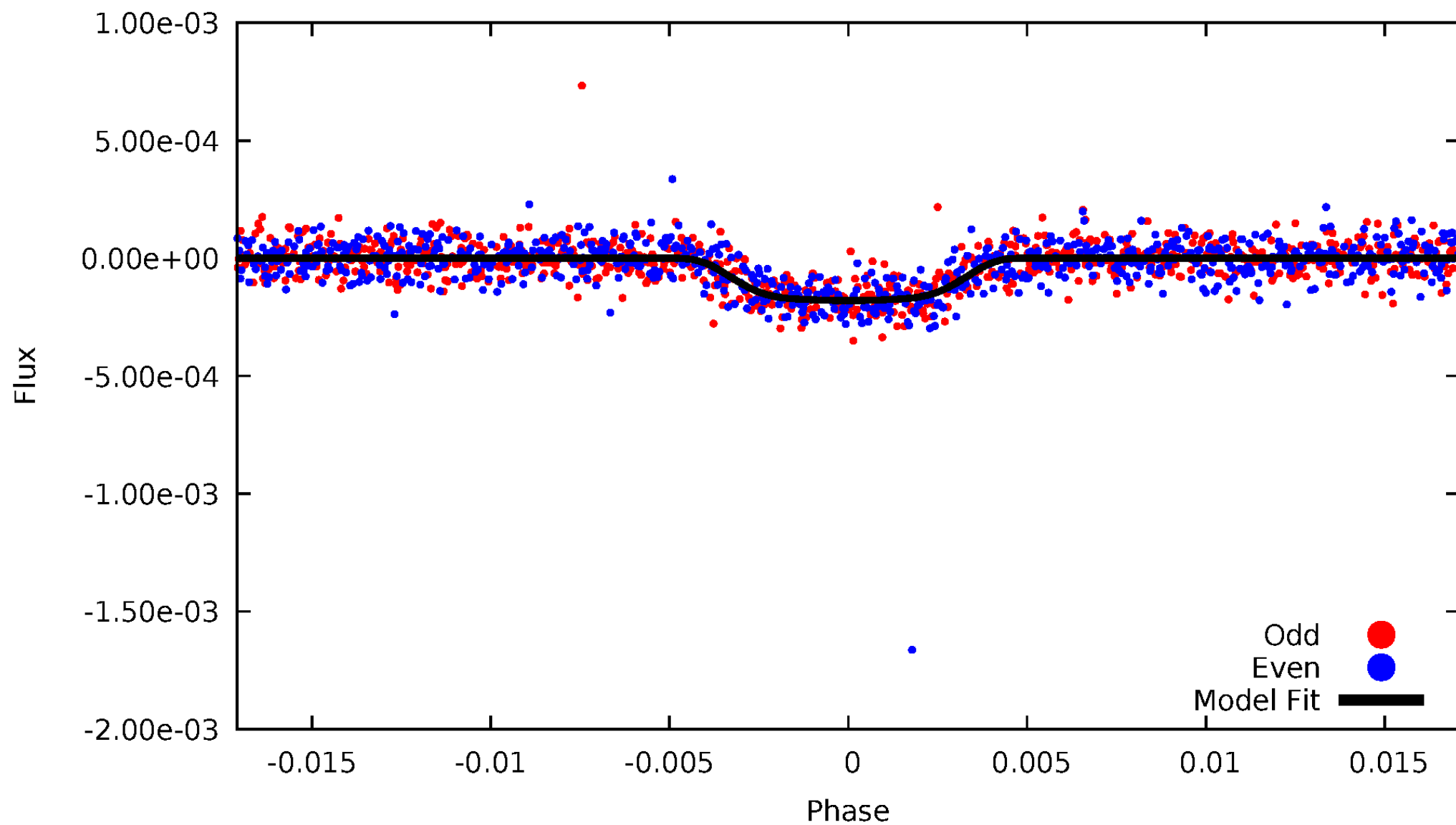


TCE 006021275-02



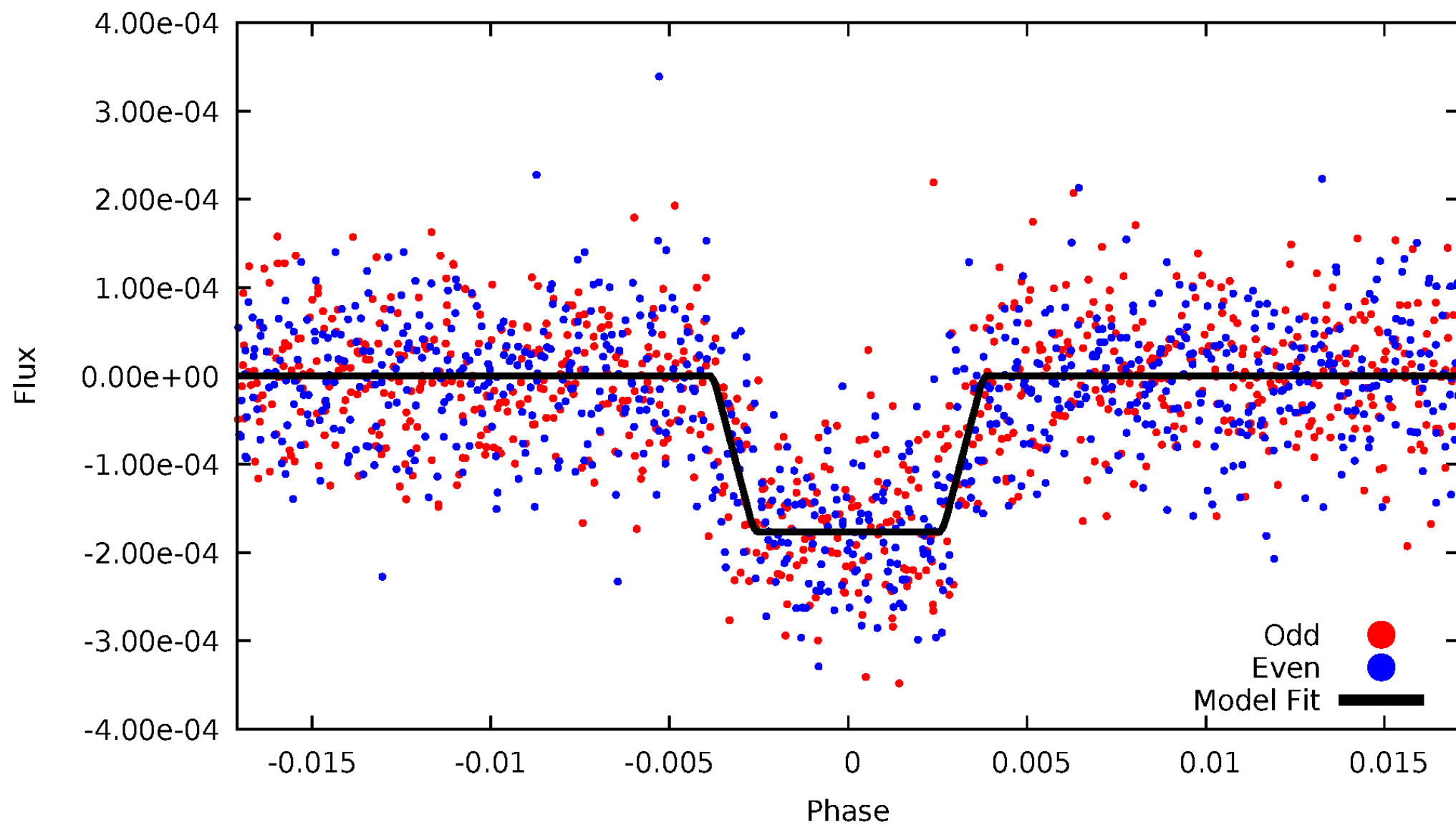
# DV Odd/Even

TCE 006021275-02



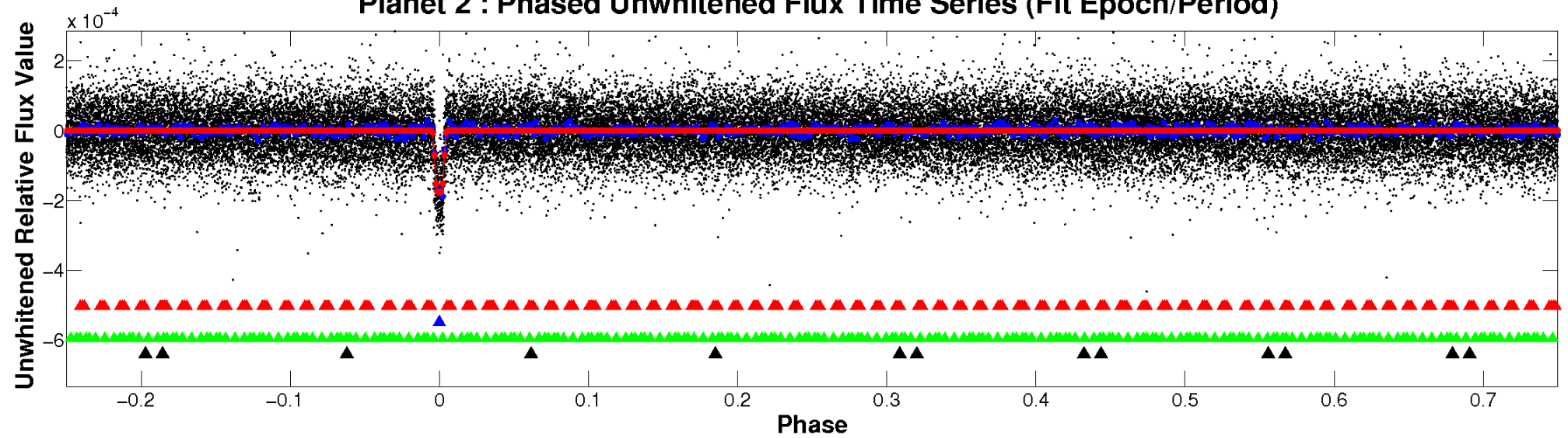
# ALT Odd/Even

TCE 006021275-02

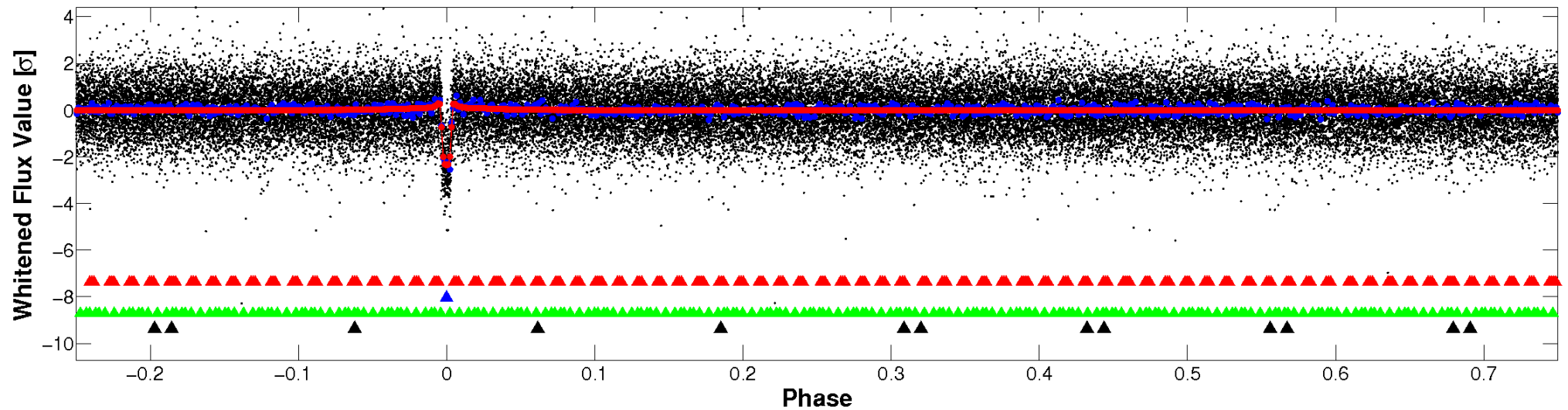


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

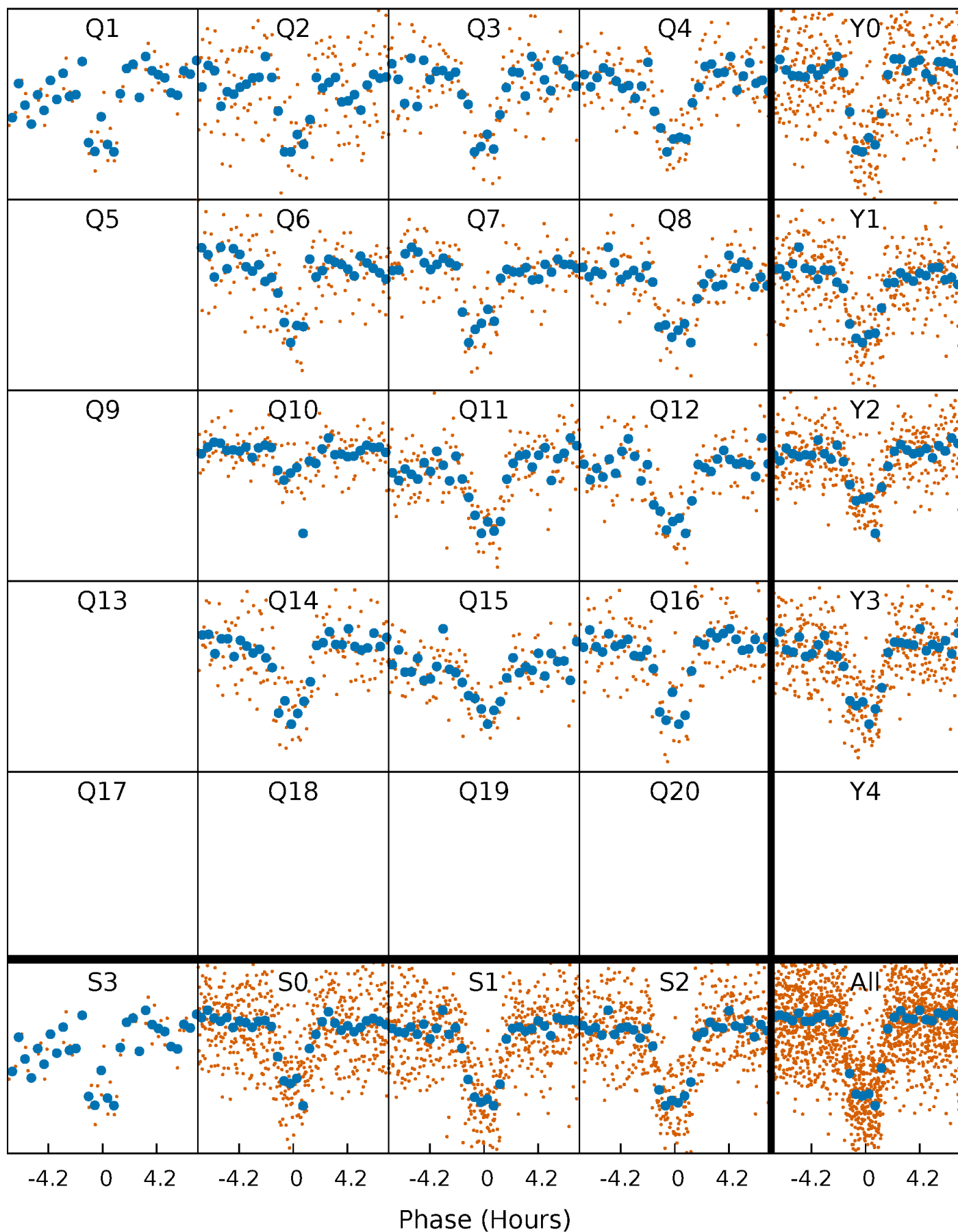


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

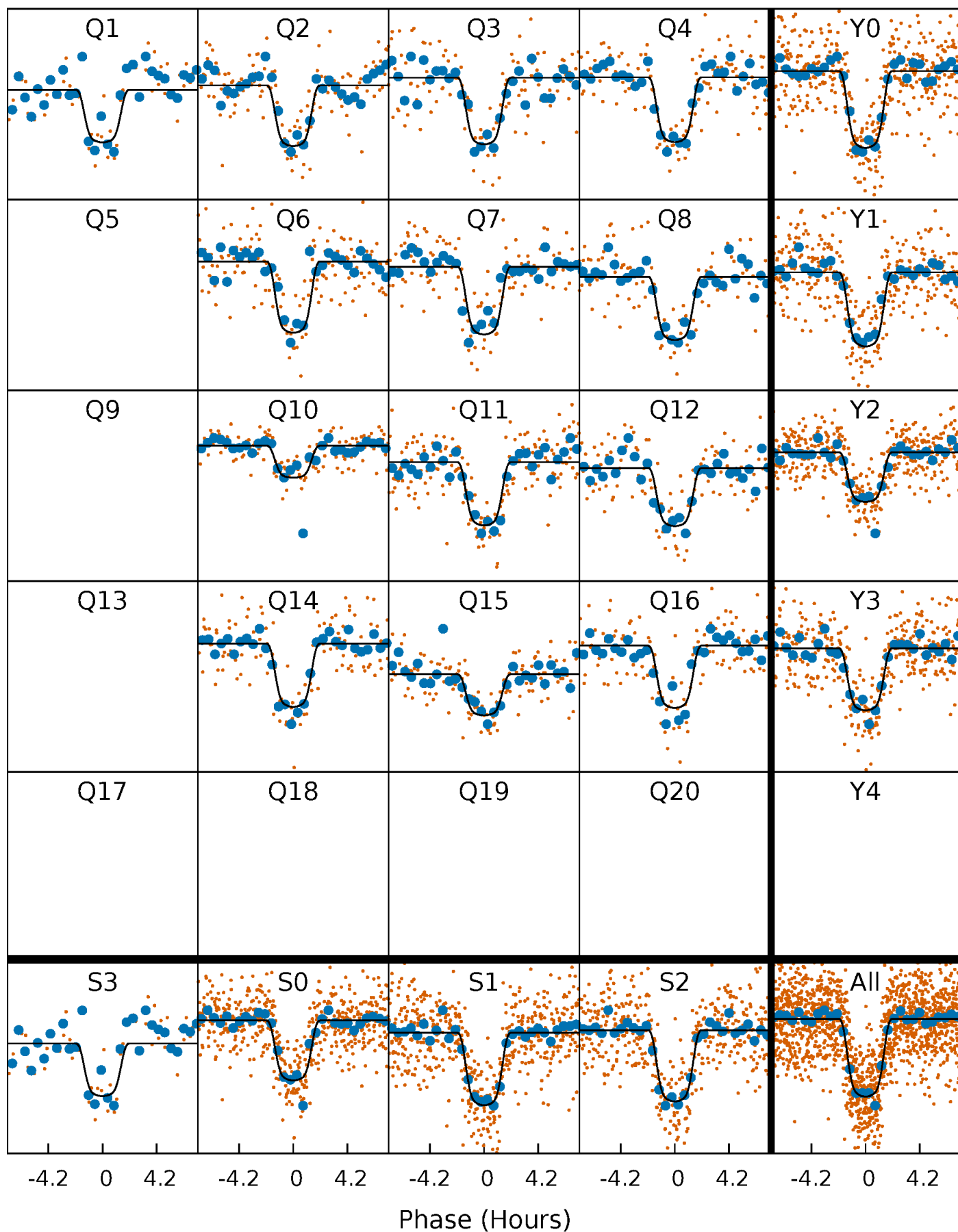
TCE 006021275-02 P= 18.010222 Days  $T_0=143.401176$  (BKJD)





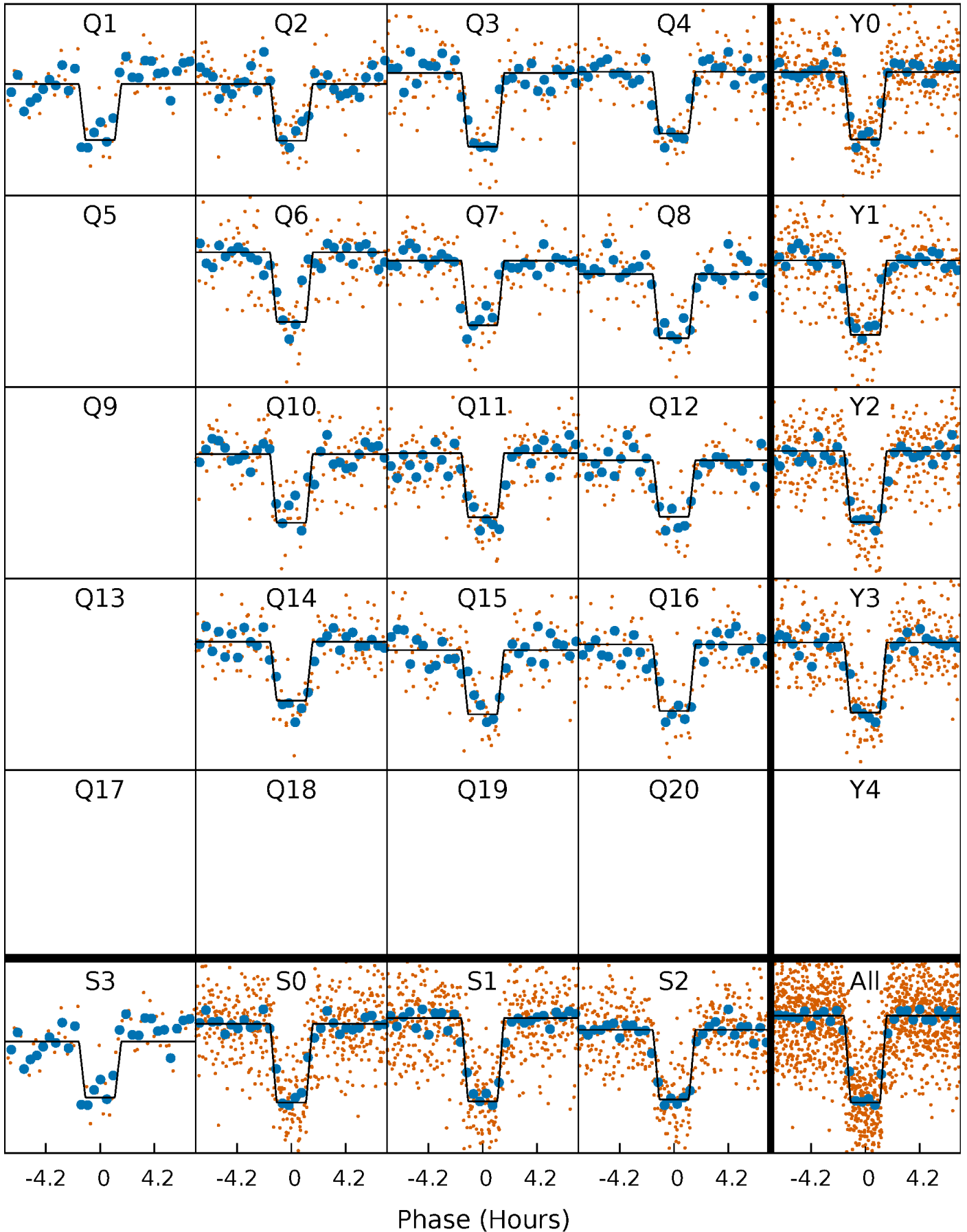
# DV Quarter-Phased Transit Curves

TCE 006021275-02 P= 18.010222 Days  $T_0=143.401176$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

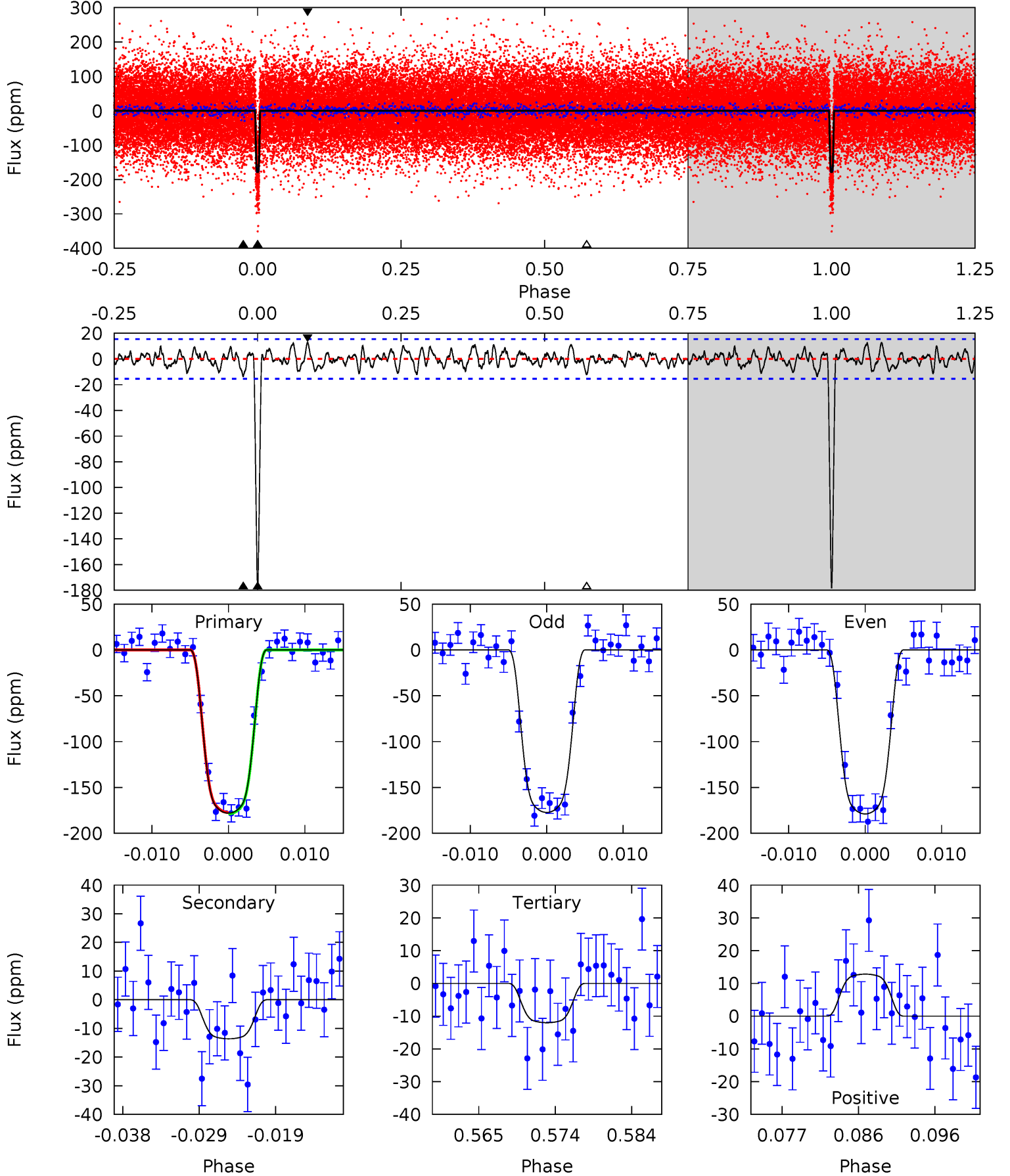
TCE 006021275-02 P= 18.010009 Days  $T_0=143.408697$  (BKJD)



# DV Model-Shift Uniqueness Test

006021275-02,  $P = 18.010222$  Days,  $E = 125.390954$  Days

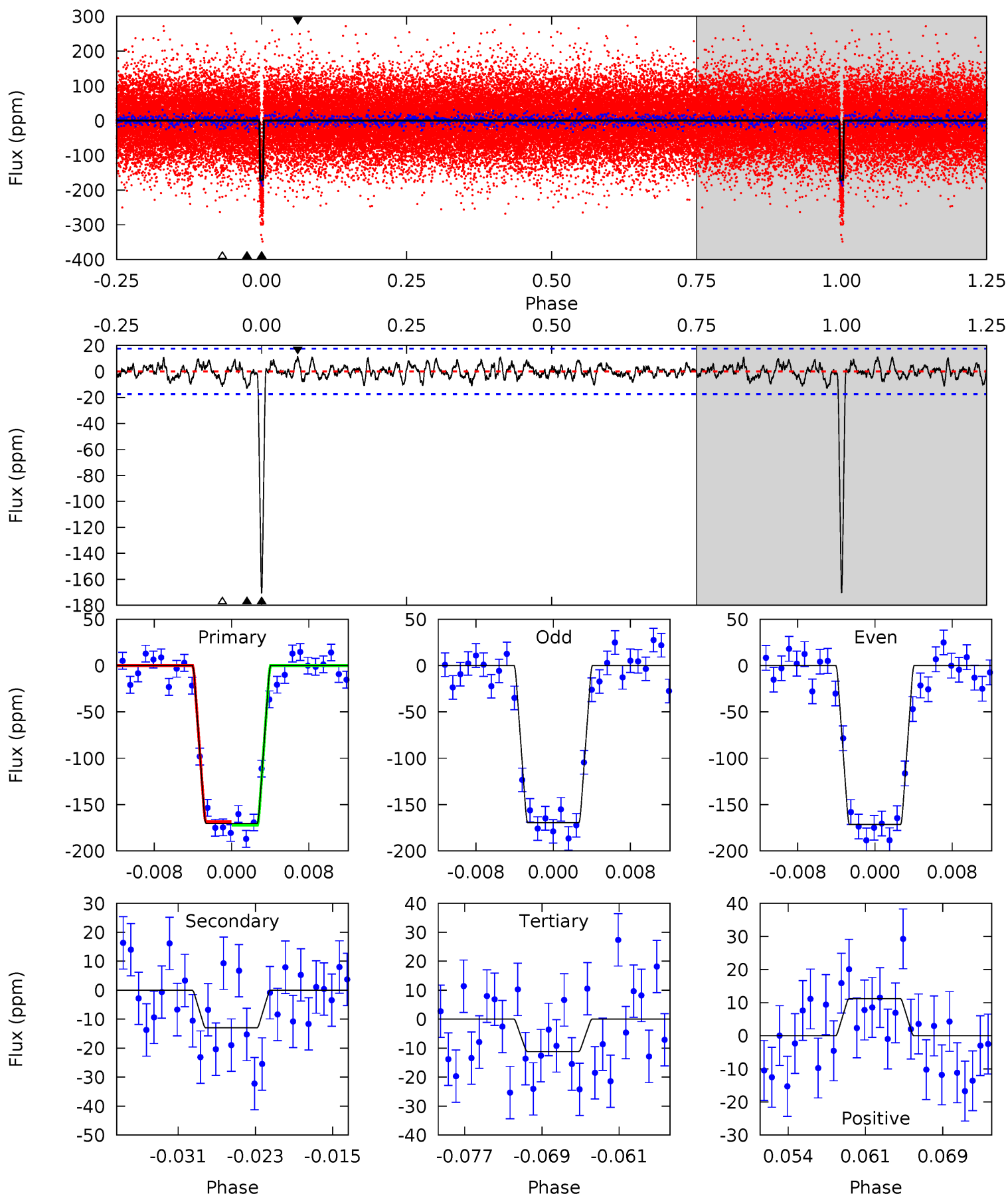
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
58.0	4.43	3.91	4.17	5.03	2.59	1.48	54.1	53.8	0.52	0.26	0.26	1.03	0.07	0.22



# Alt Model-Shift Uniqueness Test

006021275-02,  $P = 18.010009$  Days,  $E = 125.398688$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.5	3.77	3.25	3.25	5.08	2.67	1.19	46.3	46.3	0.52	0.52	0.27	0.97	0.06	0.55



### Stellar Parameters For KIC 006021275

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5931^{+107}_{-118}$	$4.322^{+0.137}_{-0.112}$	$-0.240^{+0.150}_{-0.150}$	$1.101^{+0.157}_{-0.173}$	$0.929^{+0.066}_{-0.066}$	$0.980^{+0.606}_{-0.319}$
	+2%/-2%	+3%/-3%	+62%/-62%	+14%/-16%	+7%/-7%	+62%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006021275-02 / KOI 0284.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-14 \pm 3$	$1.95^{+0.19}_{-0.18}$	$1058^{+46}_{-50}$	$3358^{+126}_{-137}$	$34^{+11}_{-9}$
Alt.	$-13 \pm 3$	$1.61^{+0.14}_{-0.16}$	$1059^{+44}_{-52}$	$3531^{+160}_{-166}$	$48^{+17}_{-14}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

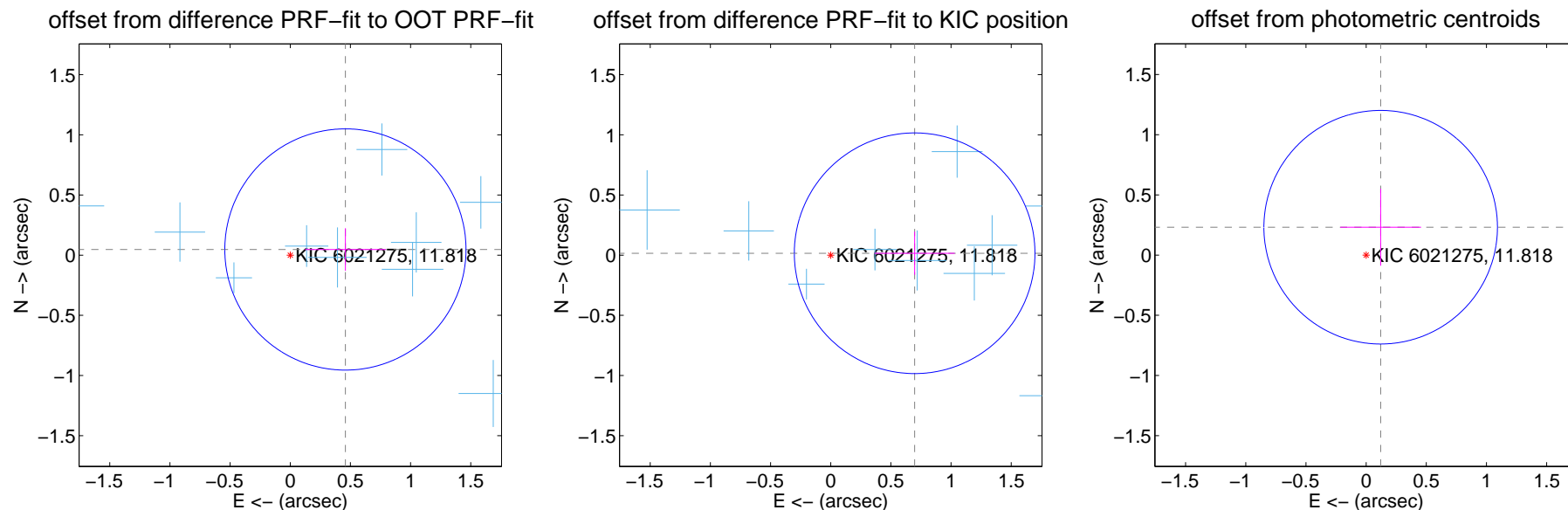
## DV Centroid Data

Supplemental centroid analysis for 006021275-02. **Kepler magnitude: 11.82.** Transit SNR 36.46

There are 11 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

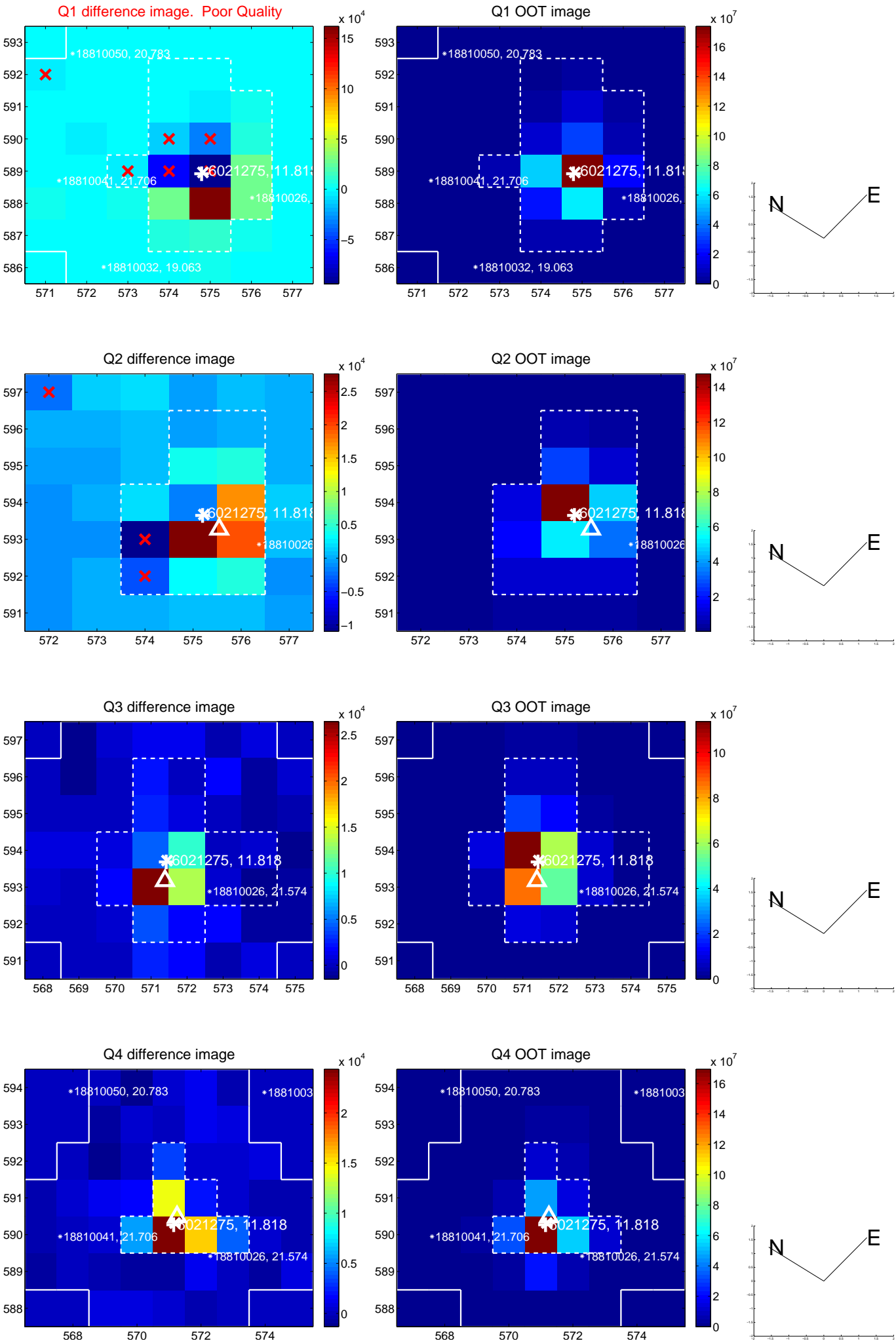
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.461 \pm 0.334$	1.38	$-0.458 \pm 0.335$	$0.047 \pm 0.177$
PRF-fit source offset from KIC position	$0.697 \pm 0.333$	2.09	$-0.697 \pm 0.333$	$0.016 \pm 0.179$
photometric centroid source offset	$0.26 \pm 0.32$	0.81	$-0.12 \pm 0.34$	$0.23 \pm 0.32$



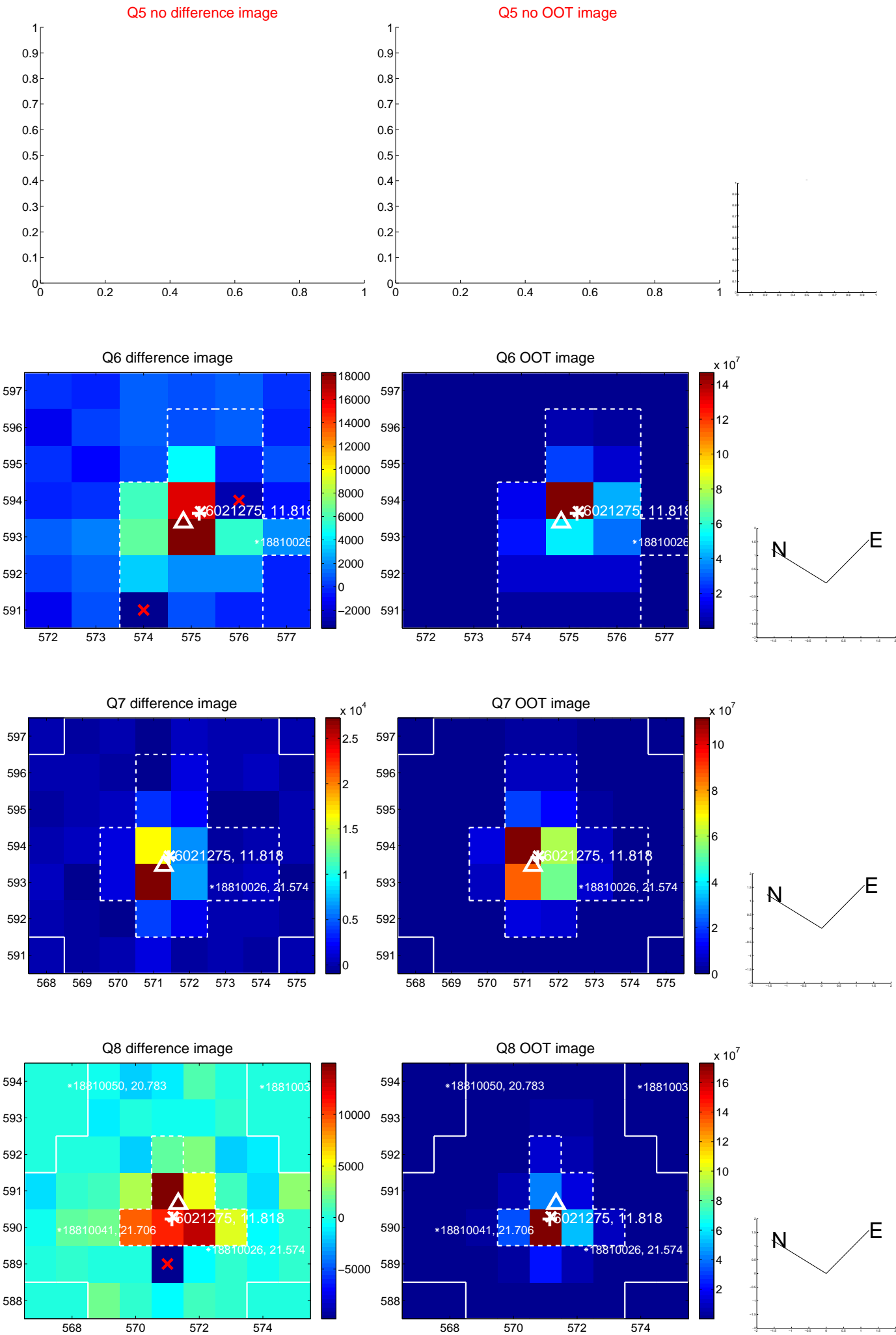
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.



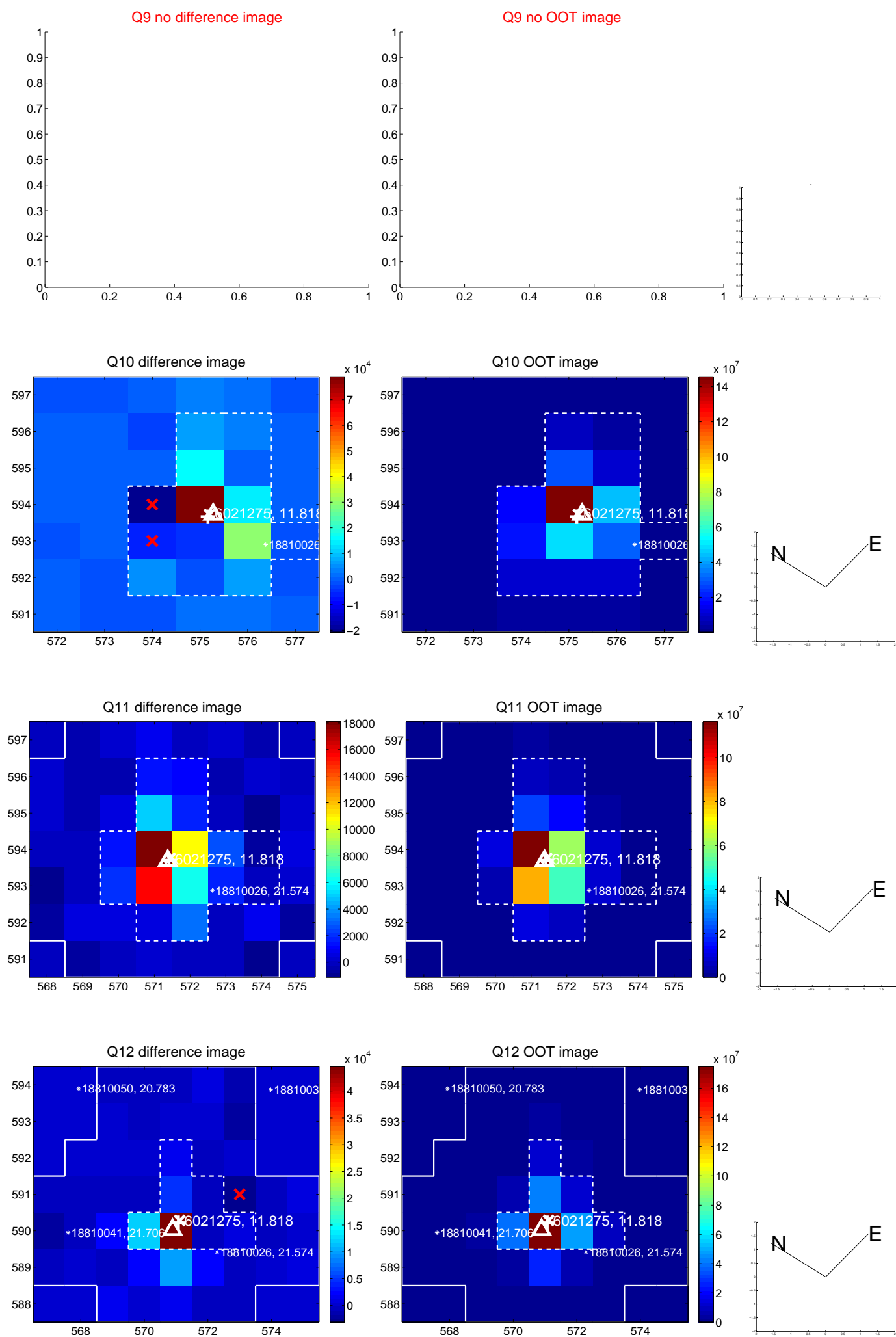
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



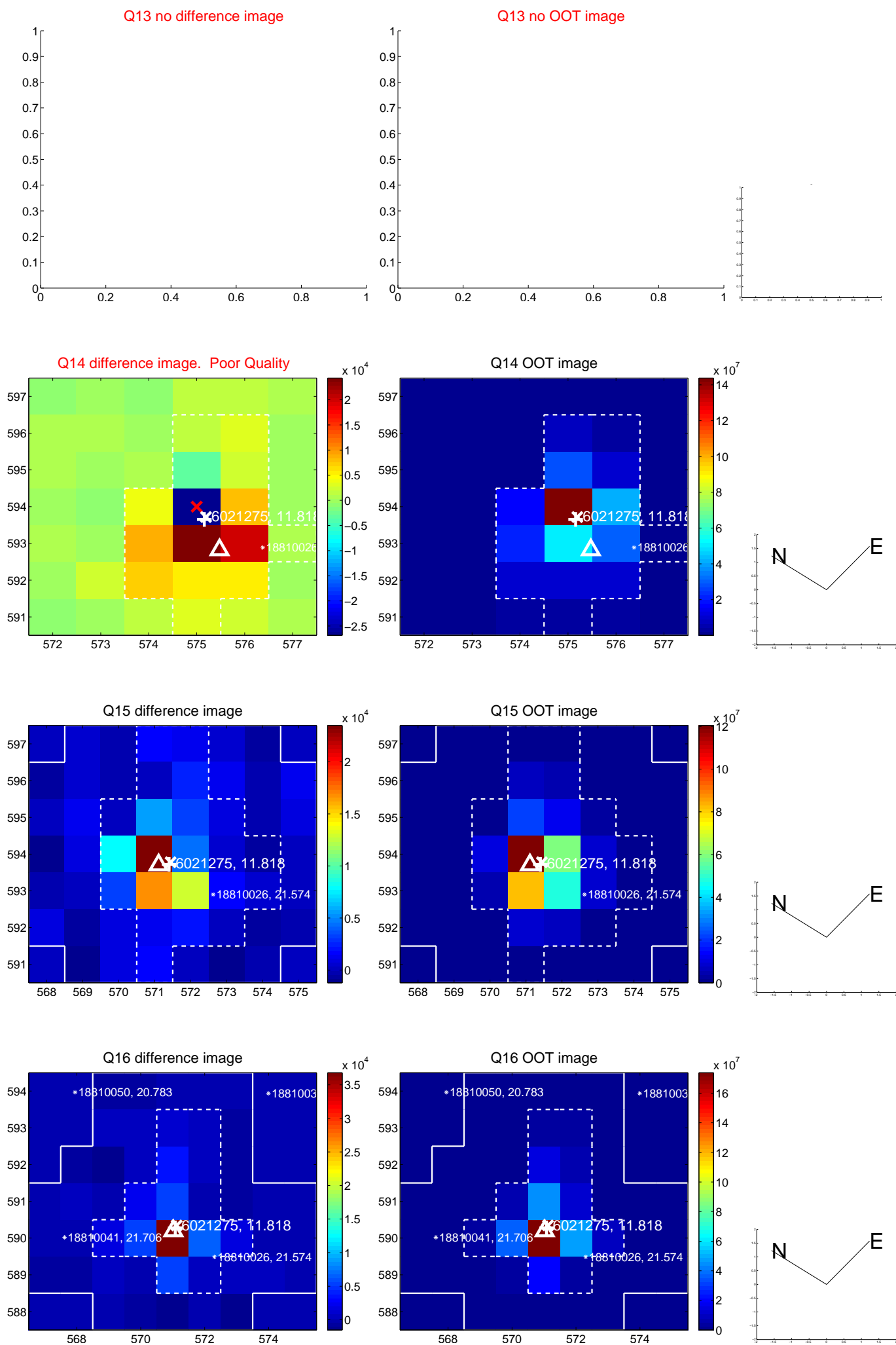
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



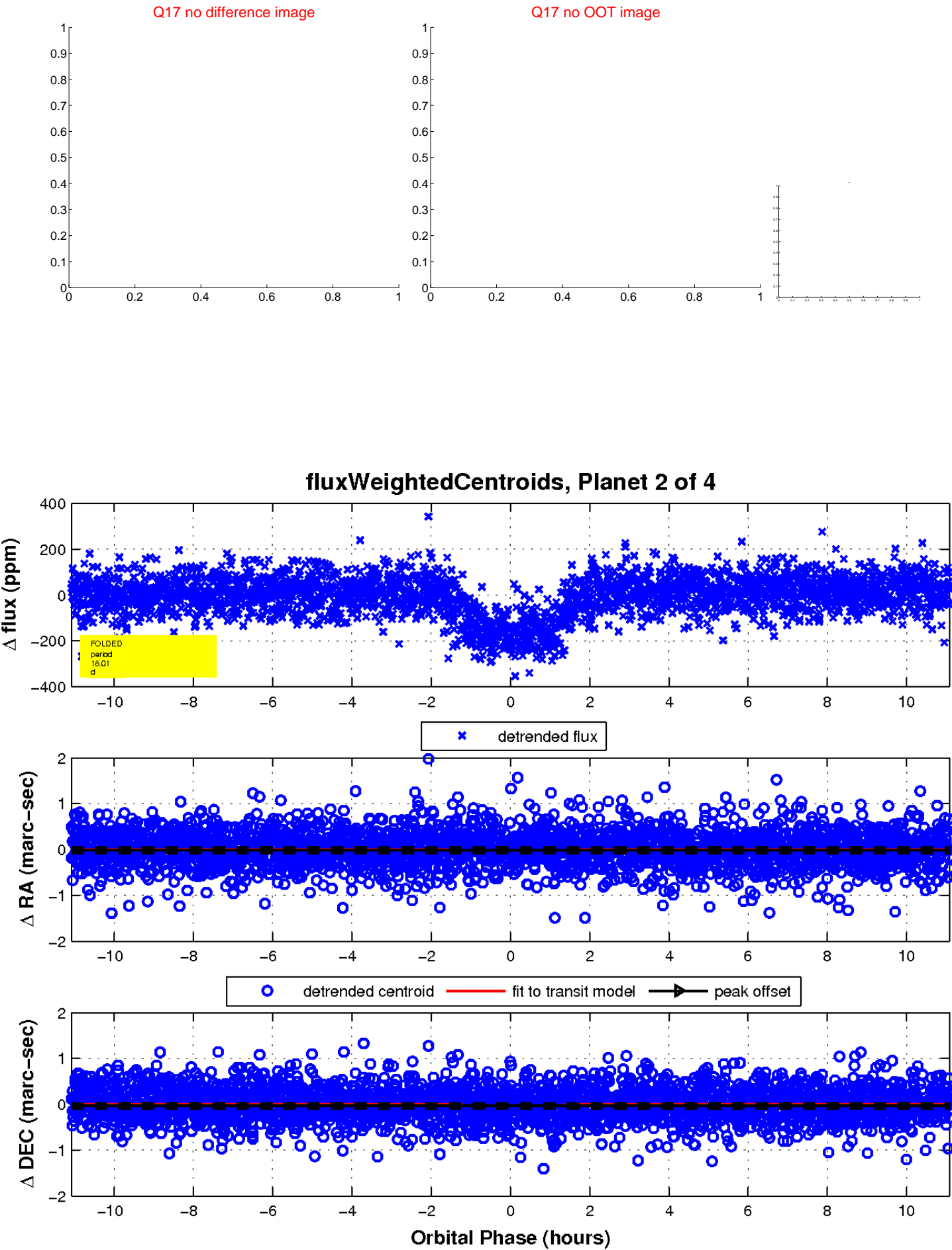
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

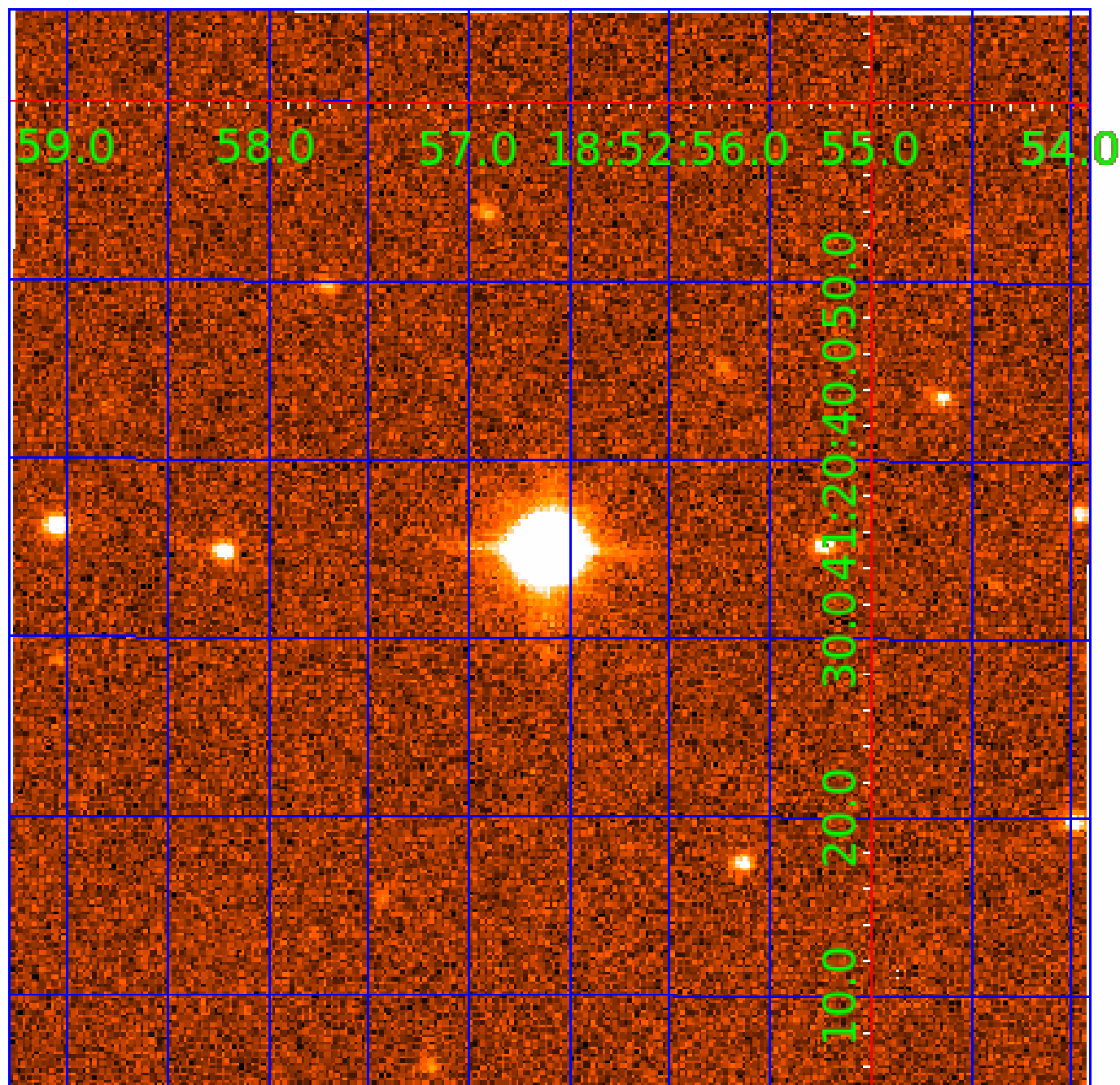


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 006021275

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006021275-01	OBS	0284.02	6.414954	137.561375	119.7	3.530	39.2	42.3	1.10	5931	1.49	309.27
006021275-02	OBS	0284.01	18.010222	143.401176	179.4	3.695	33.8	36.5	1.10	5931	1.95	78.09
006021275-03	OBS	0284.03	6.178160	131.795419	99.2	3.323	33.6	36.5	1.10	5931	1.30	325.18
006021275-04	OBS	0284.04	110.286793	239.218122	122.8	4.362	10.0	10.9	1.10	5931	1.37	6.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006021275-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
006021275-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT
006021275-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006021275-04	OBS	PC	0.84	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

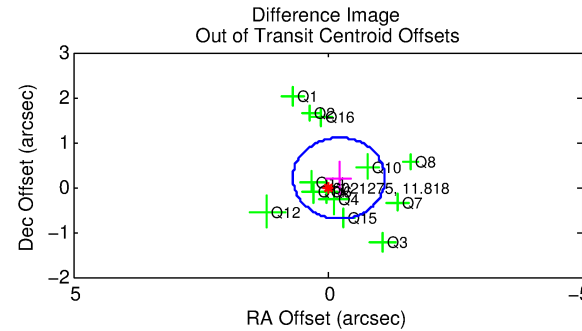
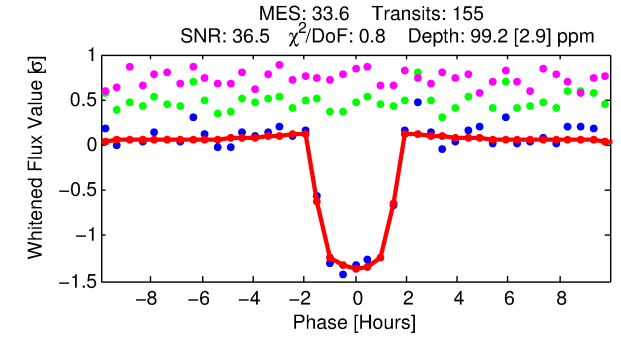
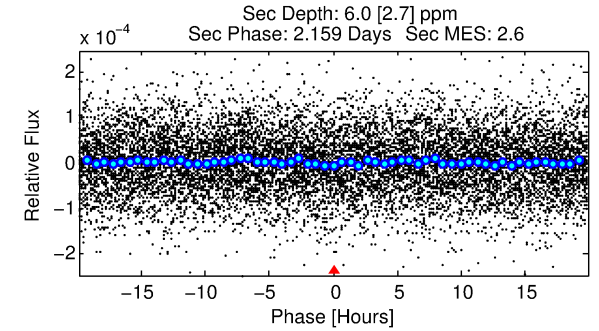
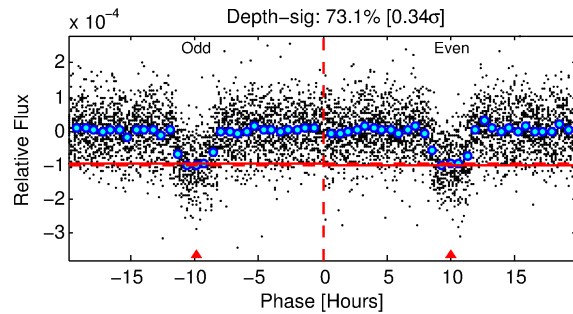
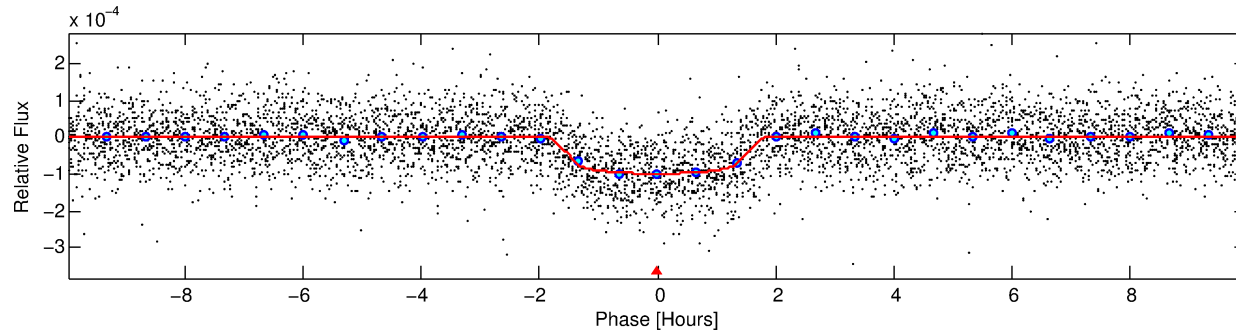
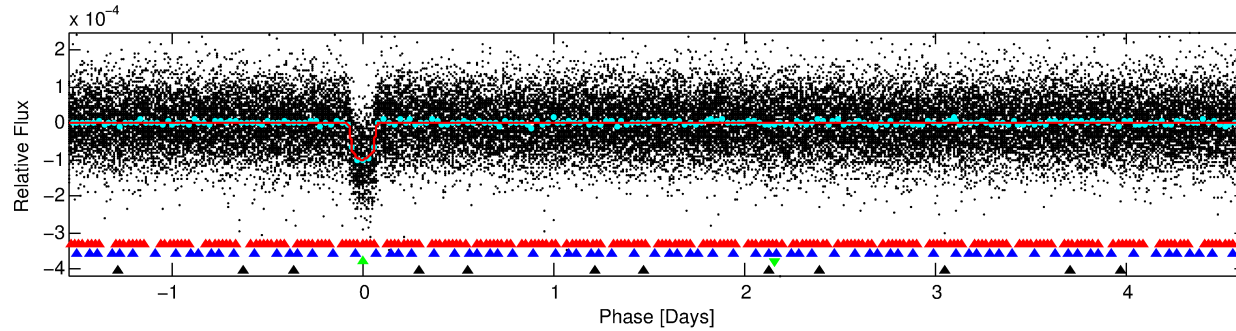
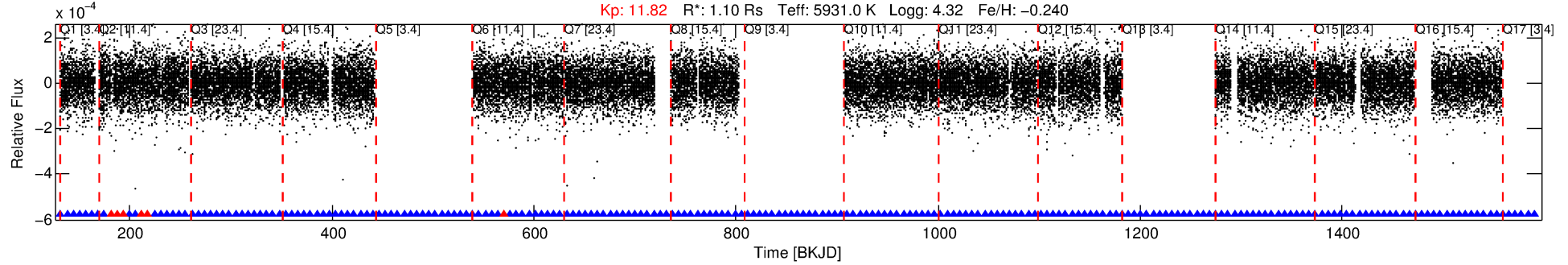
Ephemeris Match Information For 006021275-03

No Significant Match Found

# DV One-Page Summary

KIC: 6021275 Candidate: 3 of 4 Period: 6.178 d  
KOI: K00284.03 Name: Kepler-132b Corr: 0.944

Kp: 11.82 R\*: 1.10 Rs Teff: 5931.0 K Logg: 4.32 Fe/H: -0.240



## DV Fit Results:

Period = 6.17816 [0.00001] d  
Epoch = 131.7954 [0.0016] BKJD  
Rp/R\* = 0.0109 [0.0017]  
a/R\* = 6.37 [4.99]  
b = 0.91 [0.16]  
Seff = 325.18 [80.66]  
Teq = 1083 [67] K  
Rp = 1.30 [0.29] Re  
a = 0.0643 [0.0095] AU  
Ag = 7.96 [4.71] [1.48σ]  
Teffp = 2812 [386] K [4.41σ]

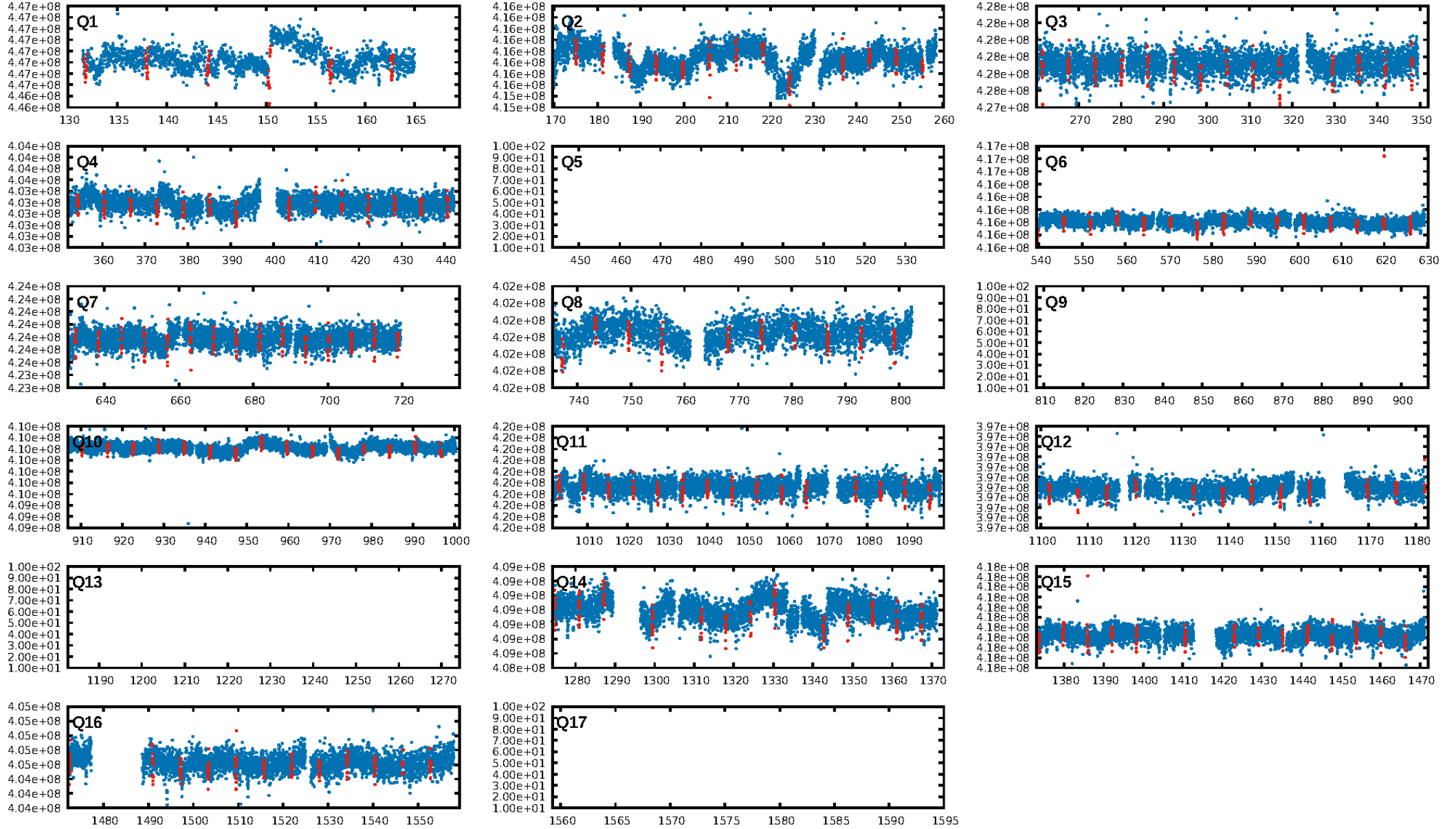
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 75.9% [1.17σ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.37e-230  
RollingBand-fgt: 0.96 [144/150]  
GhostDiagnostic-chr: 4.653  
Centroid-sig: 1.9%  
Centroid-so: 0.886 arcsec [2.58σ]  
OotOffset-rm: 0.296 arcsec [0.98σ]  
KicOffset-rm: 0.502 arcsec [1.90σ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

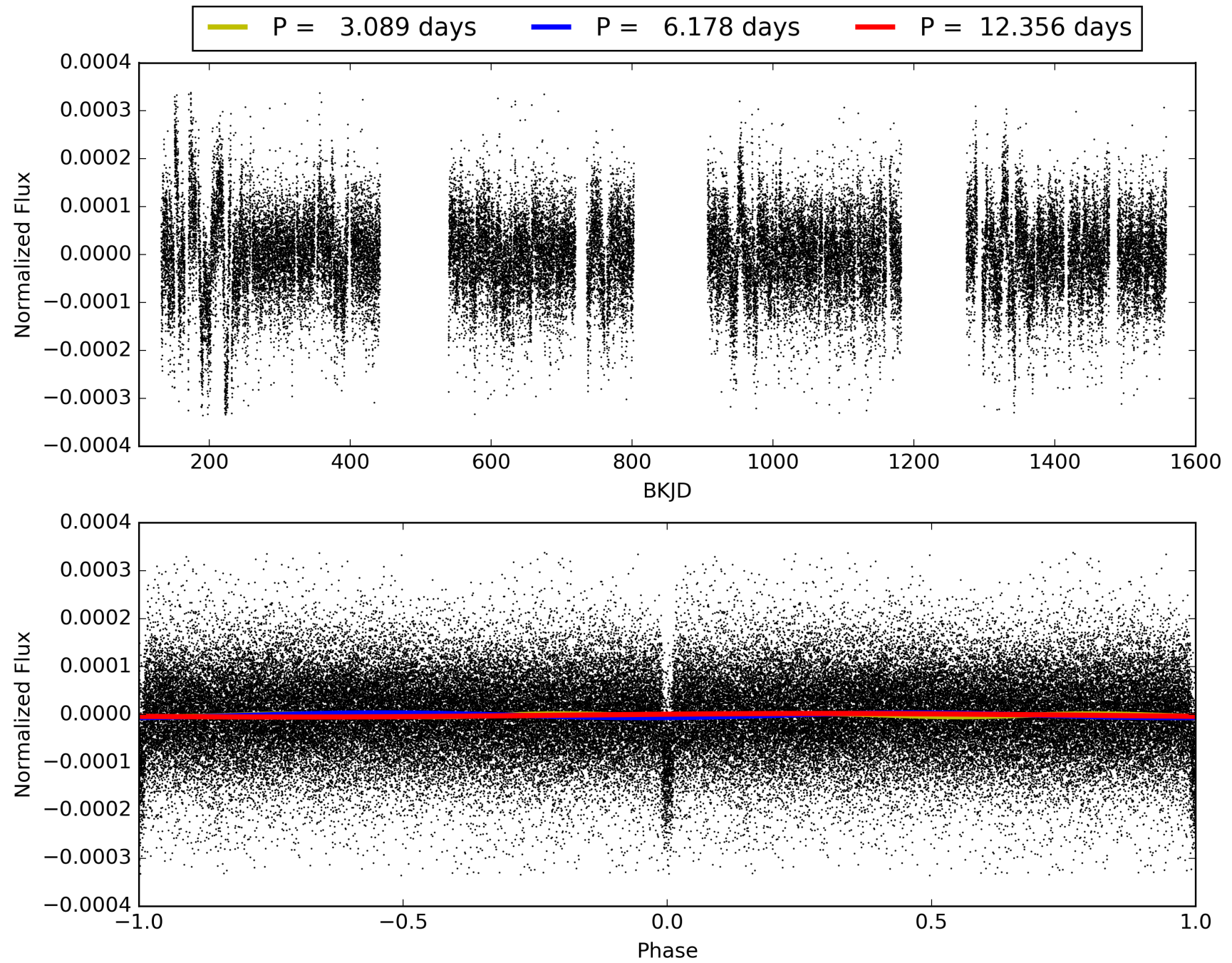
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 14:10:28 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006021275-03, PDC Light Curves

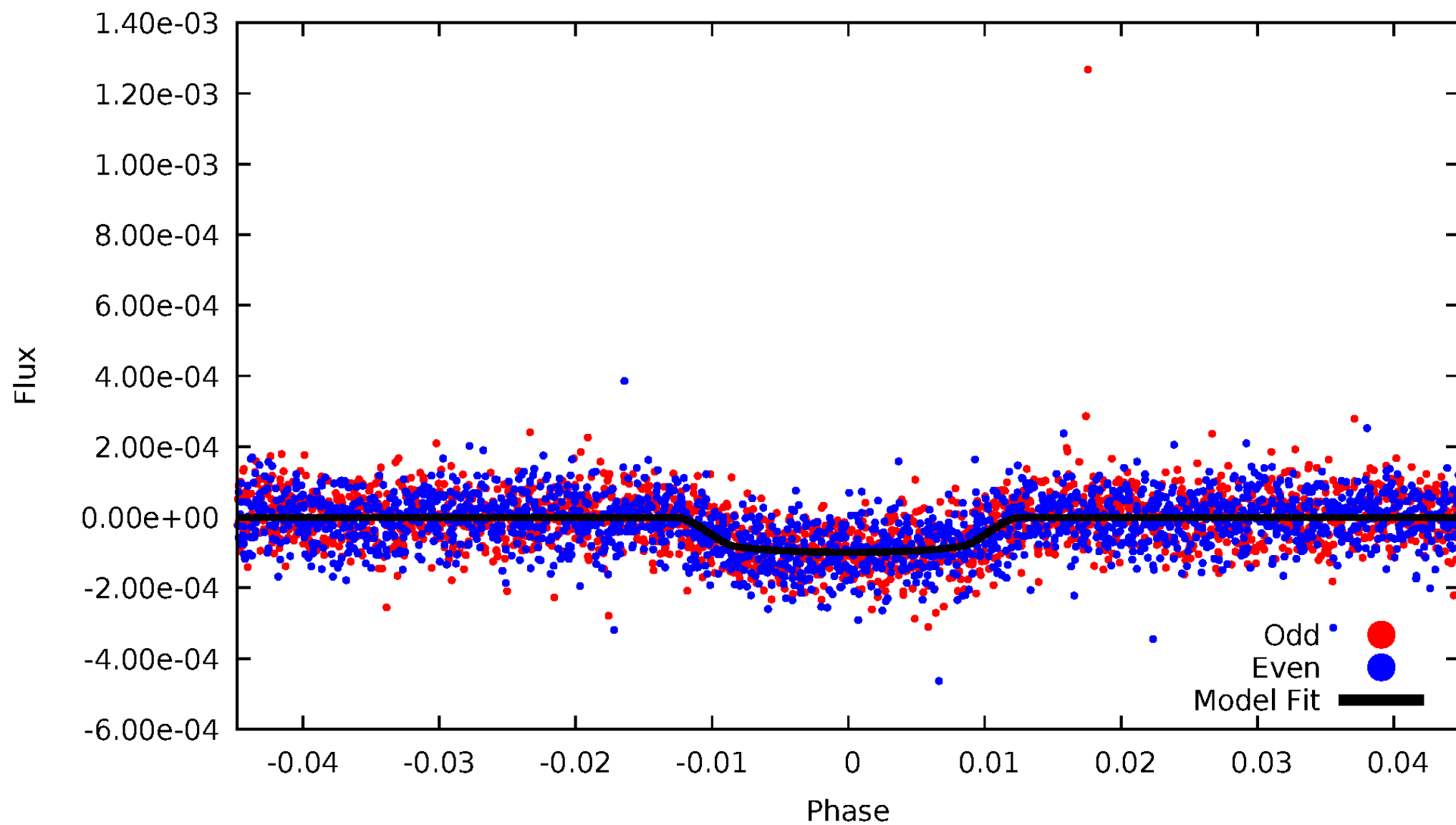


TCE 006021275-03



# DV Odd/Even

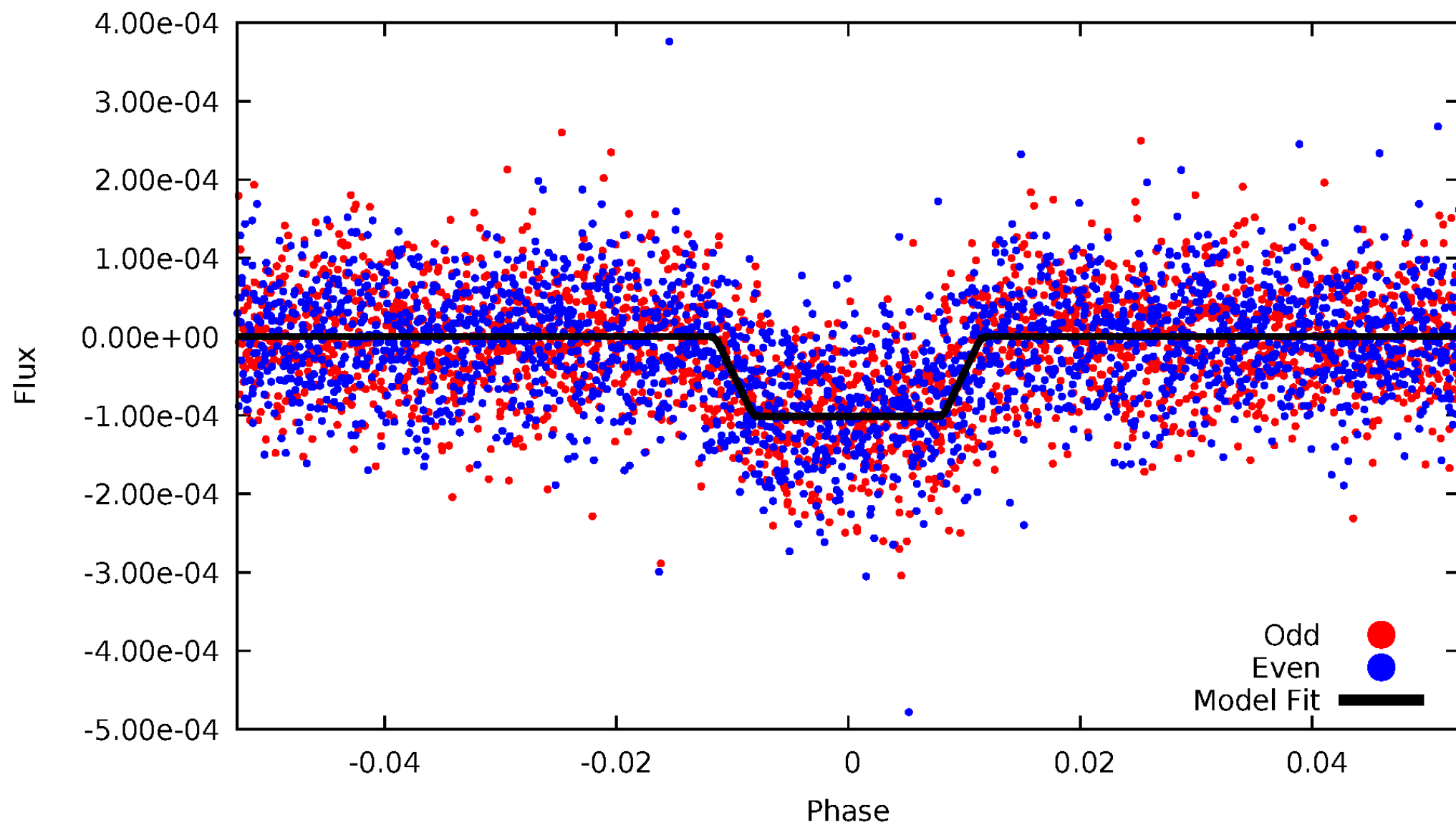
TCE 006021275-03



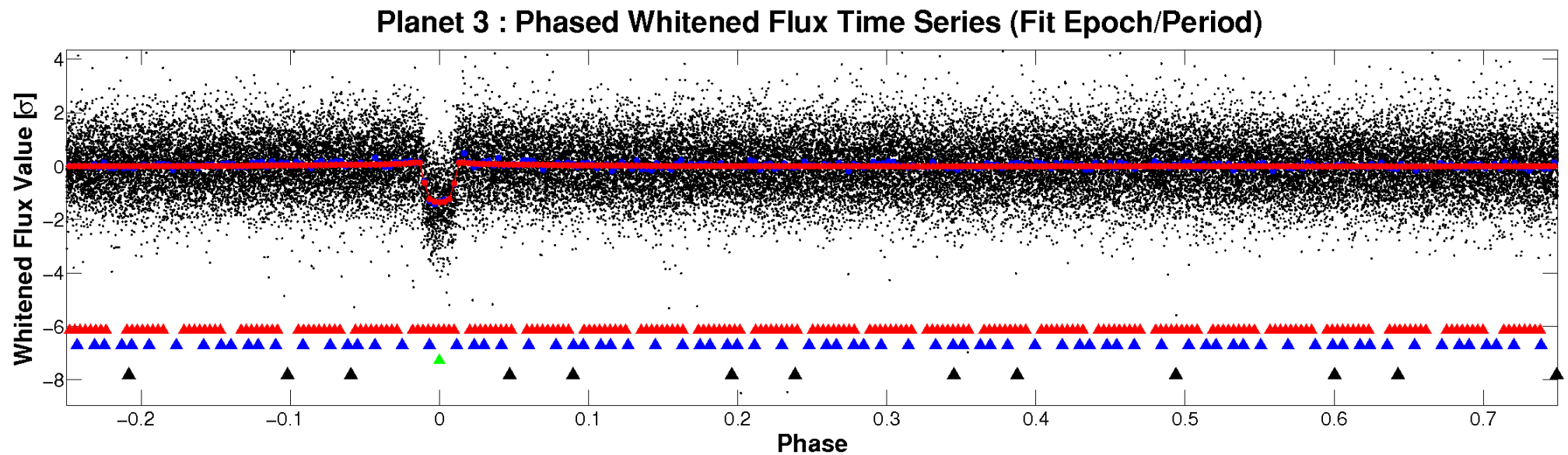
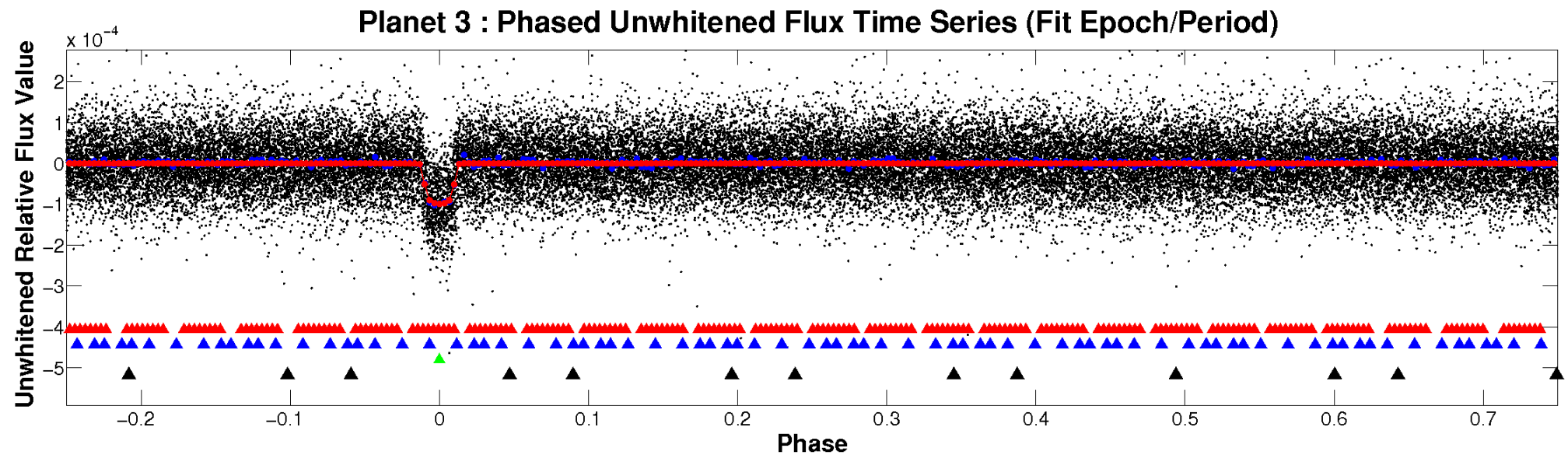


# ALT Odd/Even

TCE 006021275-03



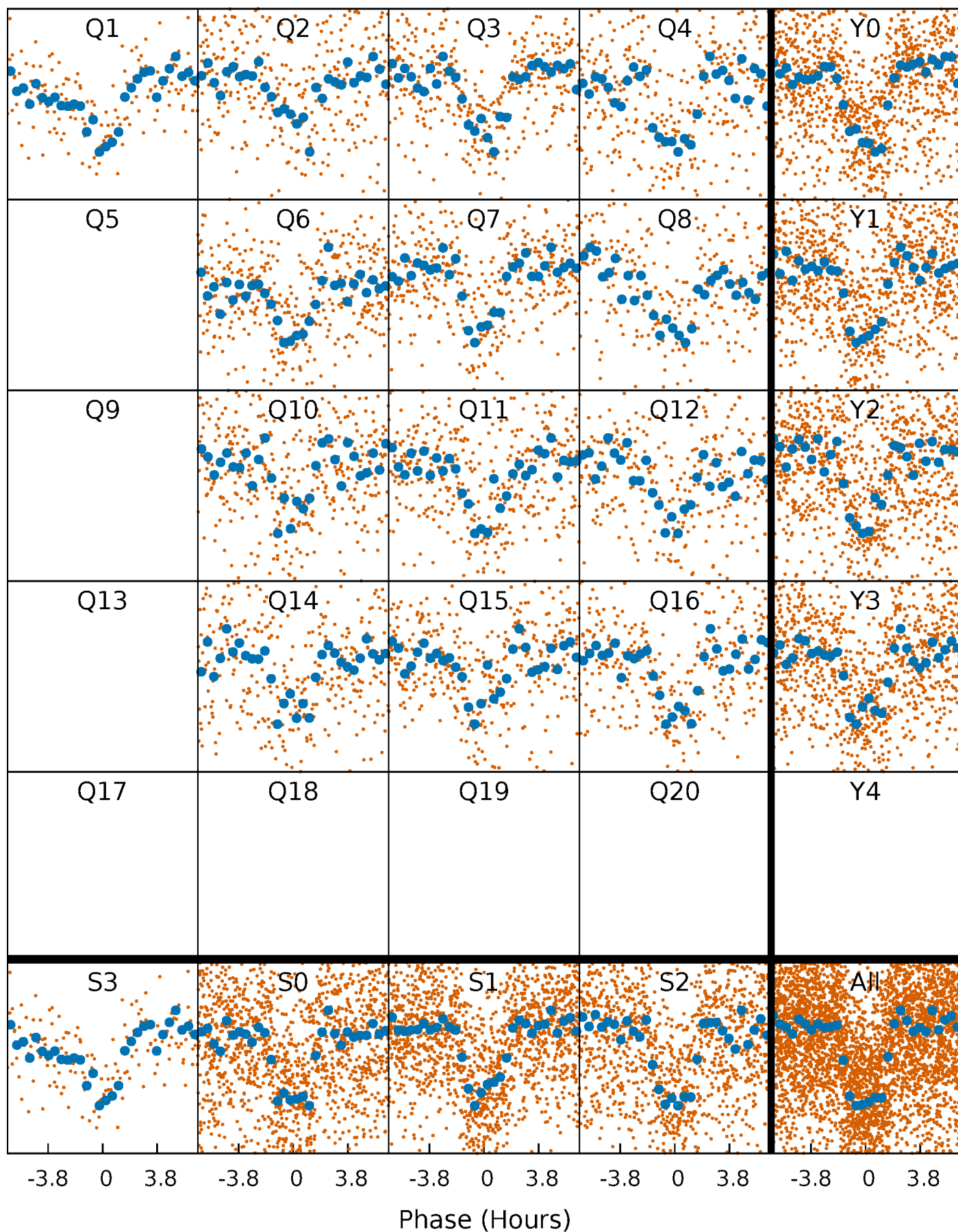
# Non-Whitened Vs. Whitened Light Curve





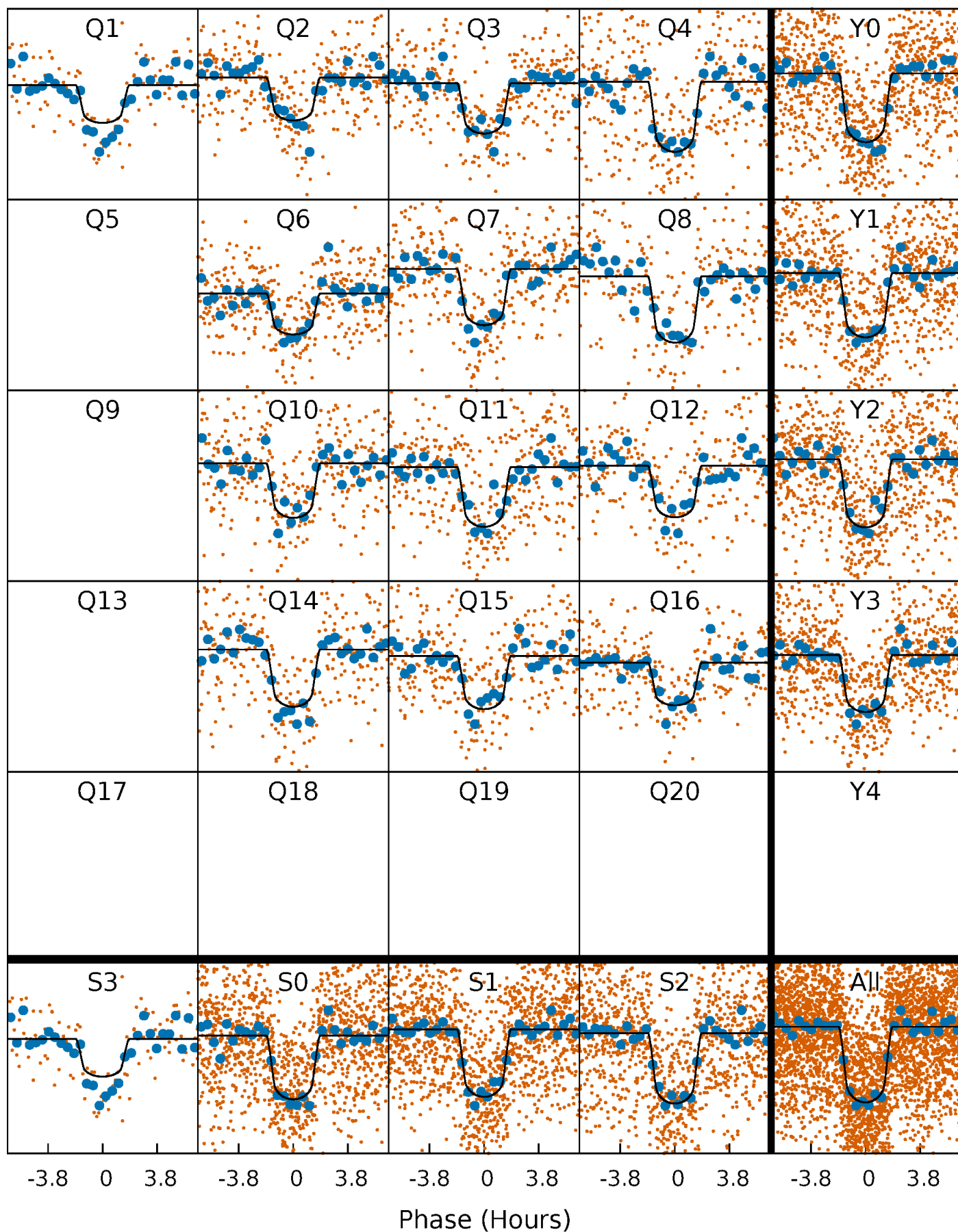
# PDC Quarter-Phased Transit Curves

TCE 006021275-03 P= 6.178160 Days  $T_0=131.795419$  (BKJD)



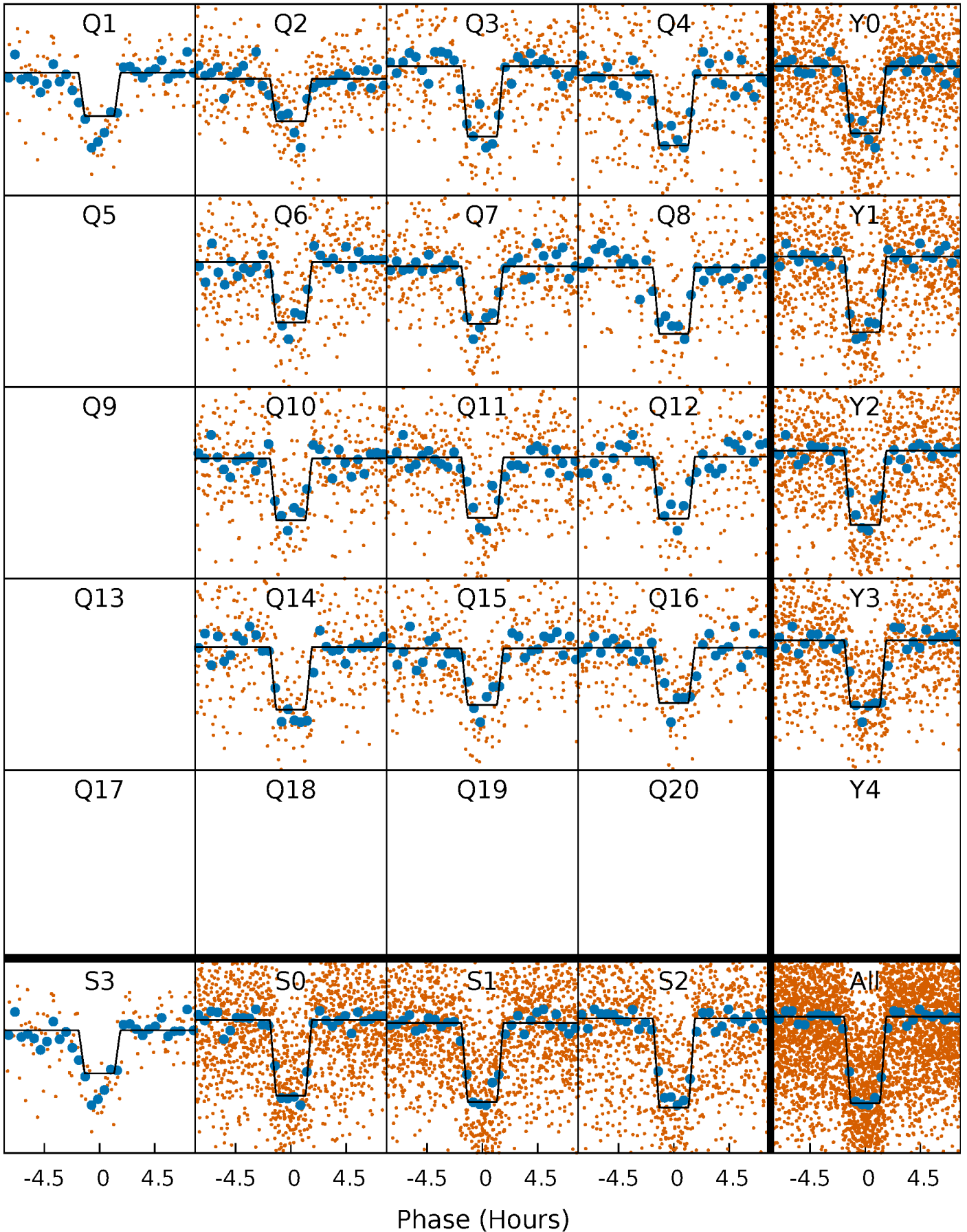
# DV Quarter-Phased Transit Curves

TCE 006021275-03 P= 6.178160 Days  $T_0=131.795419$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

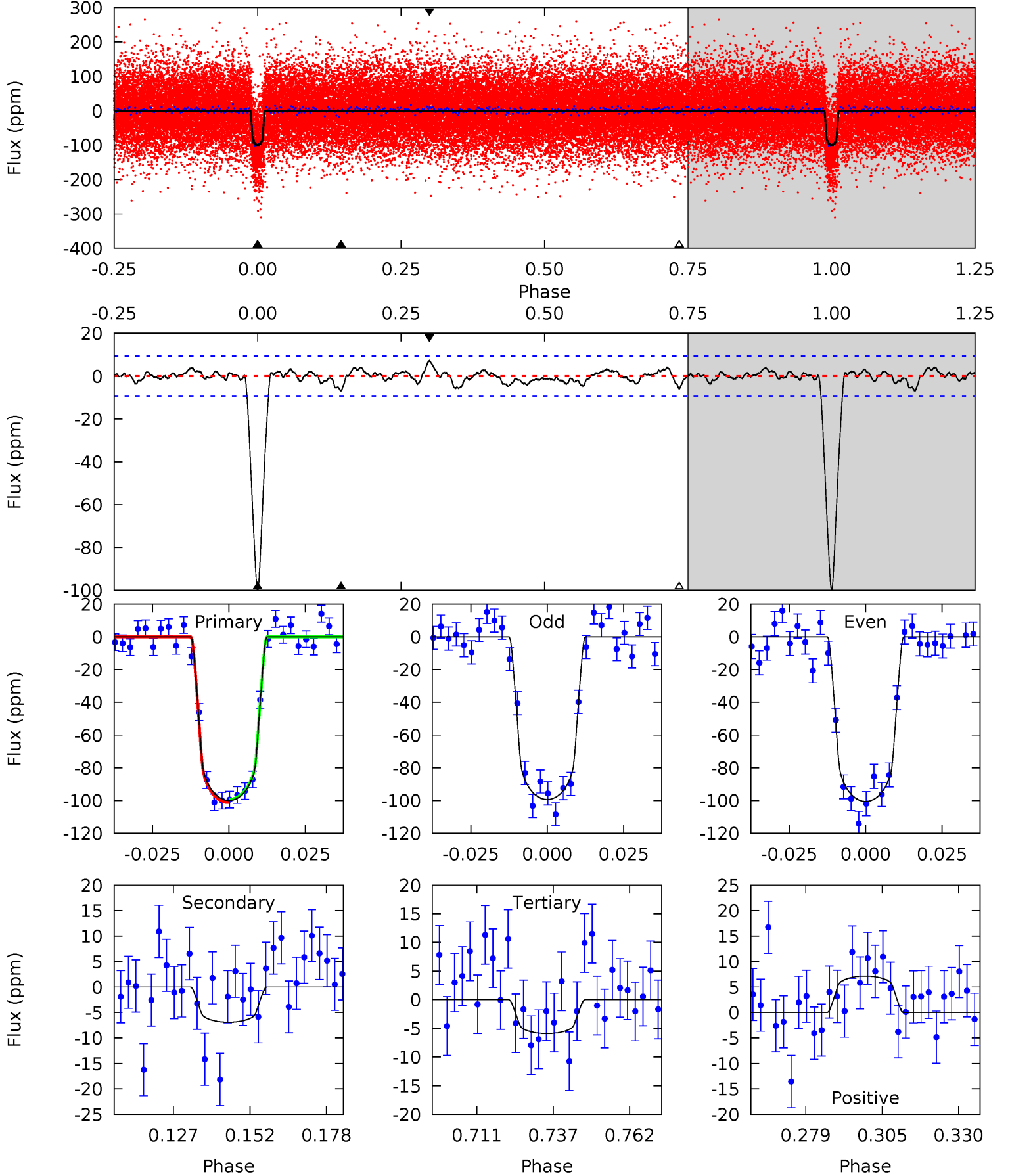
TCE 006021275-03 P= 6.178066 Days  $T_0=131.805336$  (BKJD)



# DV Model-Shift Uniqueness Test

006021275-03, P = 6.178160 Days, E = 125.617259 Days

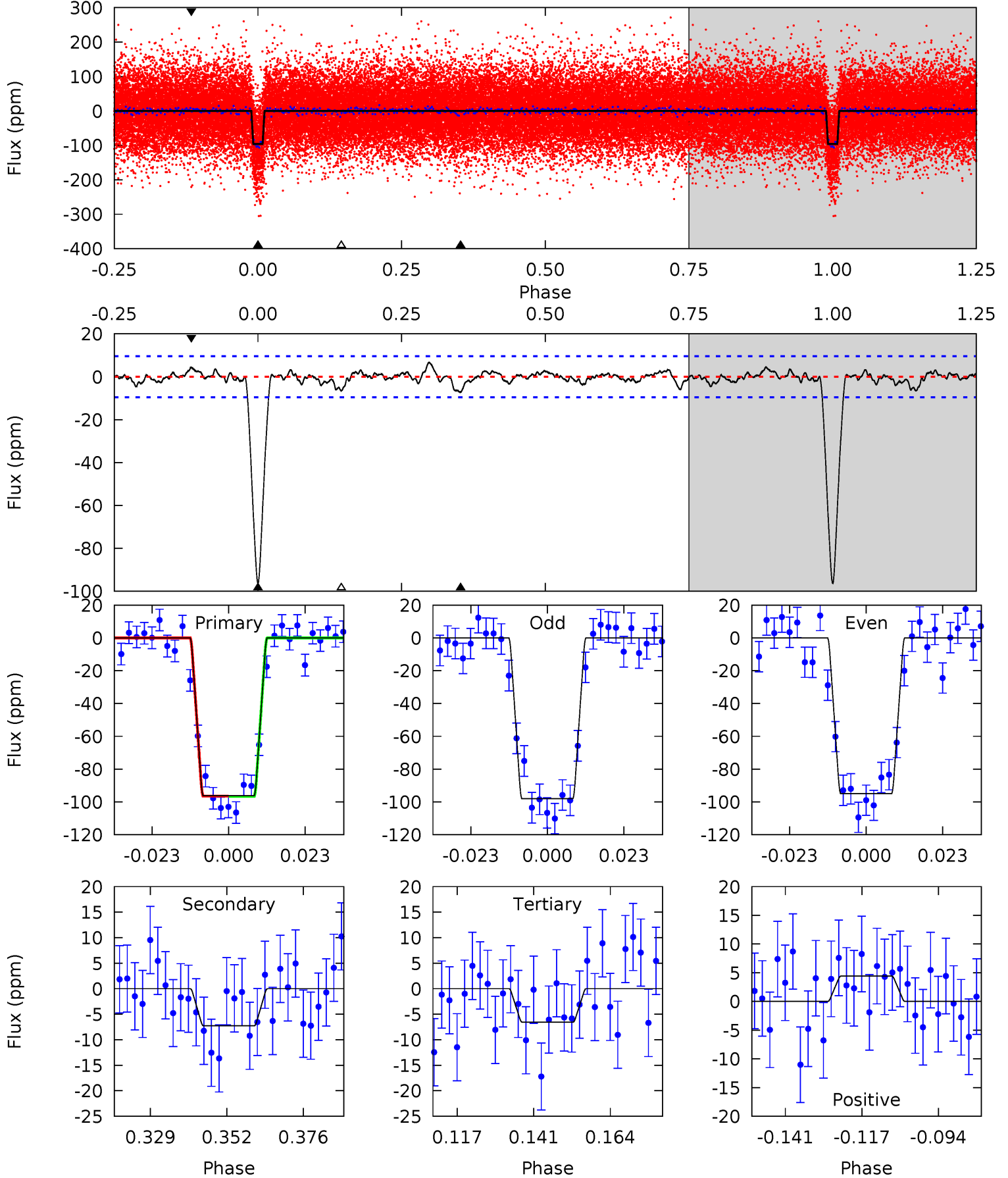
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
52.5	3.63	3.10	3.76	4.84	2.24	1.16	49.4	48.8	0.53	-0.12	0.31	1.01	0.07	0.51



# Alt Model-Shift Uniqueness Test

006021275-03, P = 6.178066 Days, E = 125.627270 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.7	3.68	3.32	2.24	4.86	2.27	1.01	45.4	46.5	0.36	1.44	0.77	1.01	0.07	0.03





### Stellar Parameters For KIC 006021275

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5931^{+107}_{-118}$	$4.322^{+0.137}_{-0.112}$	$-0.240^{+0.150}_{-0.150}$	$1.101^{+0.157}_{-0.173}$	$0.929^{+0.066}_{-0.066}$	$0.980^{+0.606}_{-0.319}$
	+2%/-2%	+3%/-3%	+62%/-62%	+14%/-16%	+7%/-7%	+62%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006021275-03 / KOI 0284.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-7 \pm 2$	$1.30^{+0.25}_{-0.24}$	$1508^{+75}_{-66}$	$3392^{+272}_{-225}$	$9.056^{+5.421}_{-3.436}$
Alt.	$-7 \pm 2$	$1.20^{+0.24}_{-0.21}$	$1512^{+70}_{-72}$	$3516^{+263}_{-225}$	$11^{+7}_{-4}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

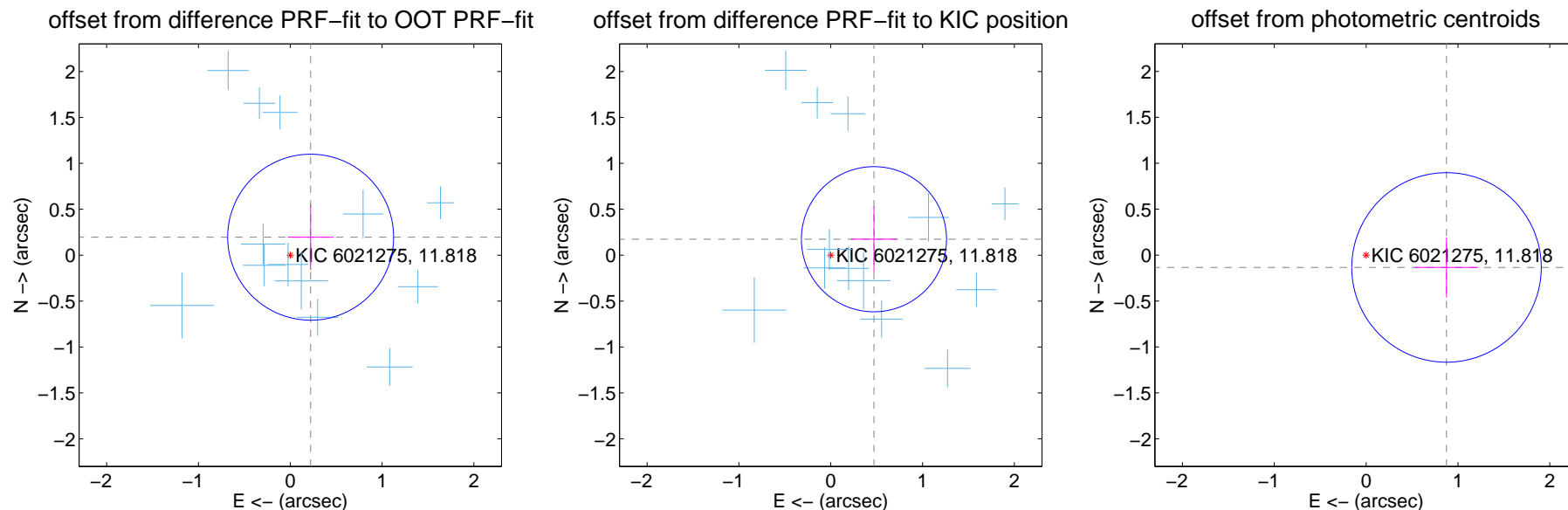
## DV Centroid Data

Supplemental centroid analysis for 006021275-03. **Kepler magnitude: 11.82.** Transit SNR 36.49

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

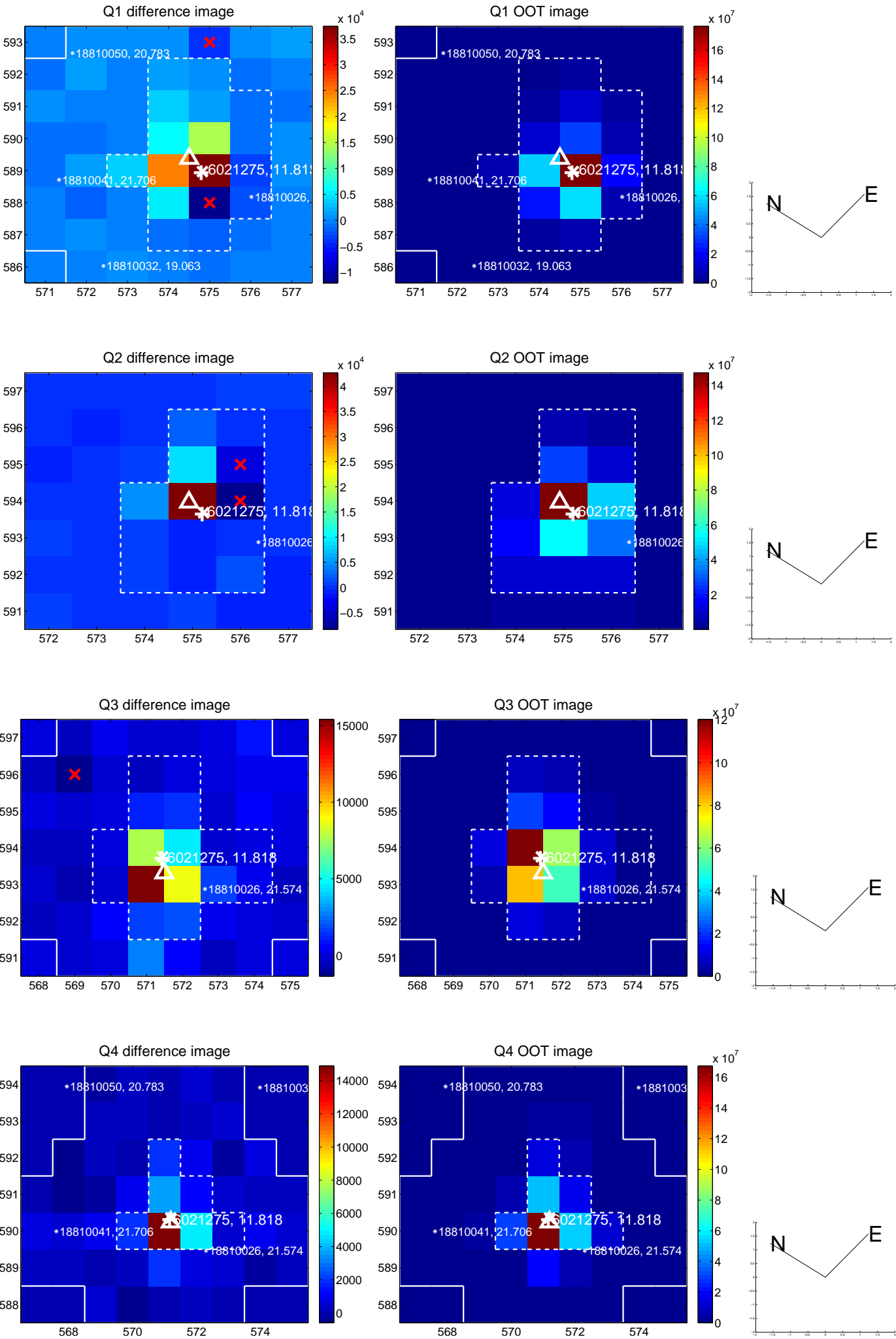
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.296 \pm 0.301$	0.98	$-0.222 \pm 0.250$	$0.195 \pm 0.357$
PRF-fit source offset from KIC position	$0.502 \pm 0.263$	1.90	$-0.471 \pm 0.248$	$0.173 \pm 0.357$
photometric centroid source offset	$0.89 \pm 0.34$	2.58	$-0.88 \pm 0.34$	$-0.13 \pm 0.33$



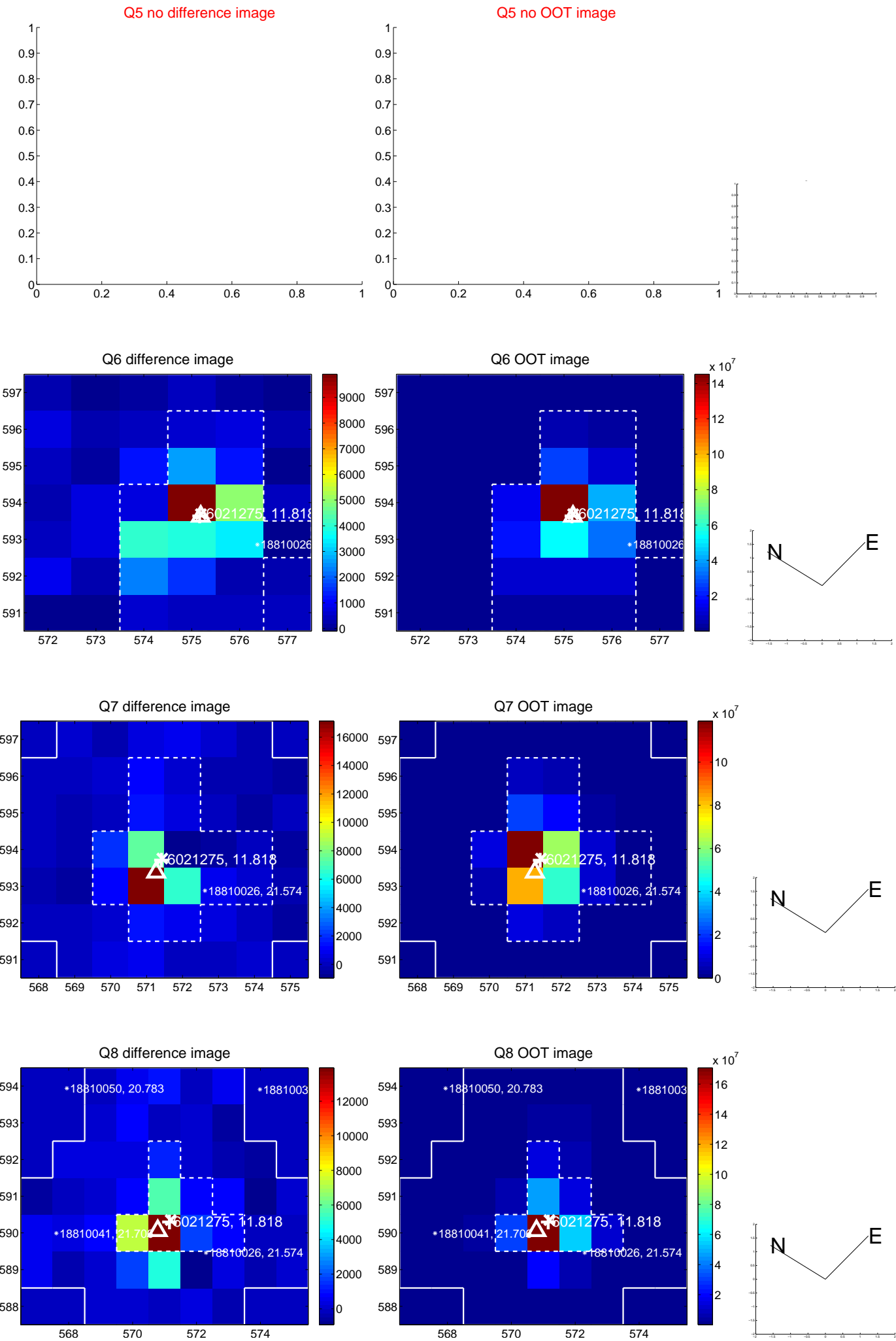
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.



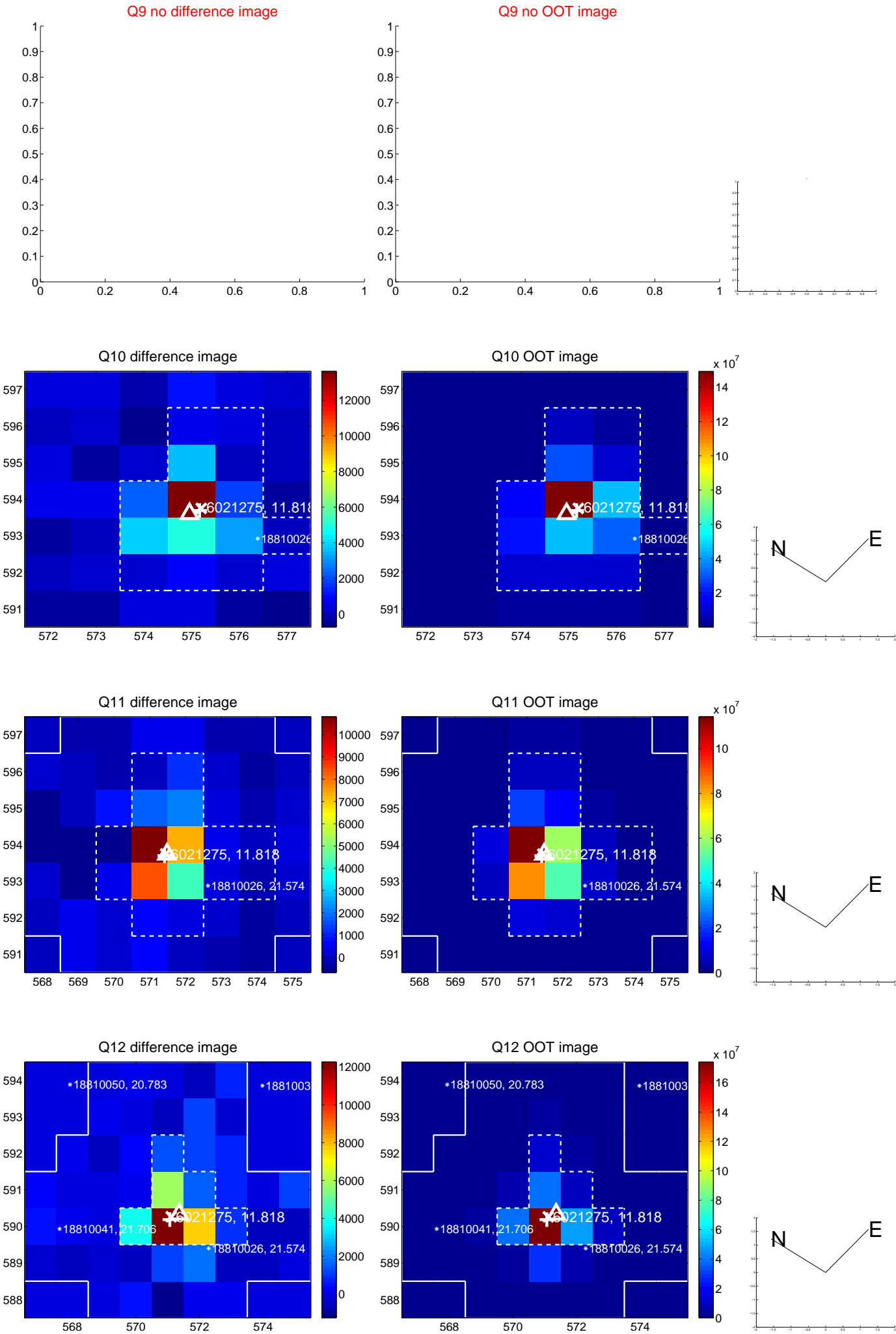
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



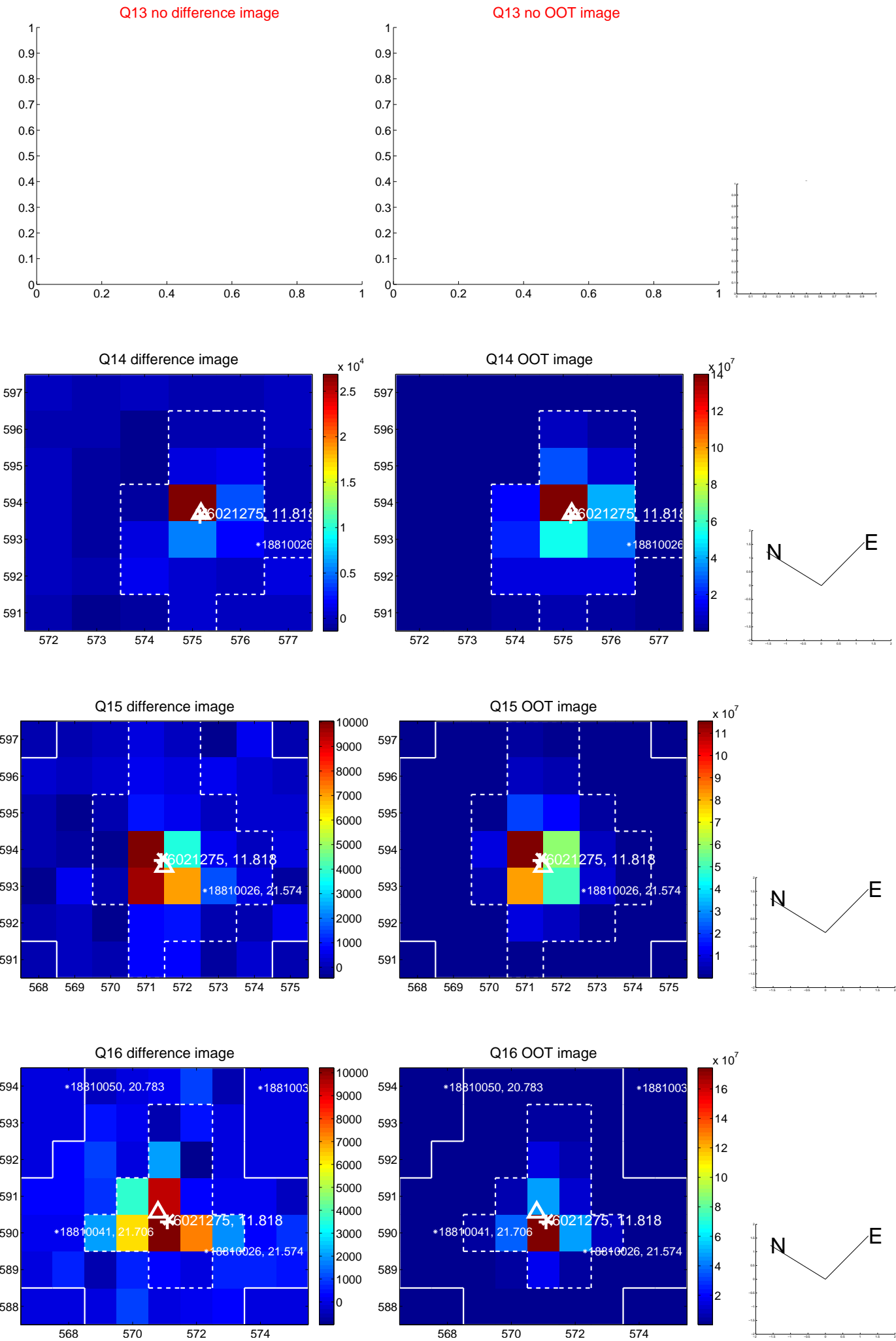
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



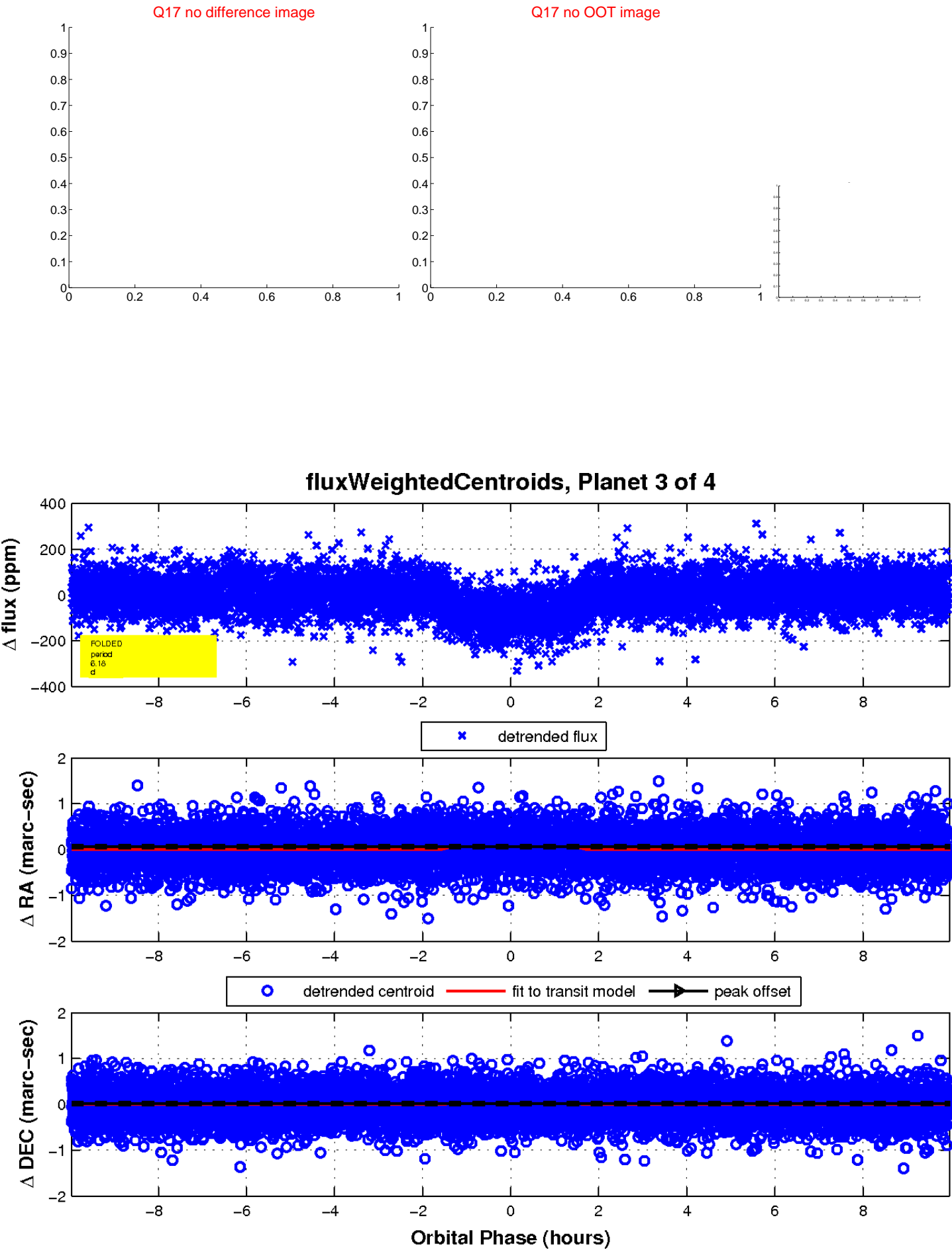
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

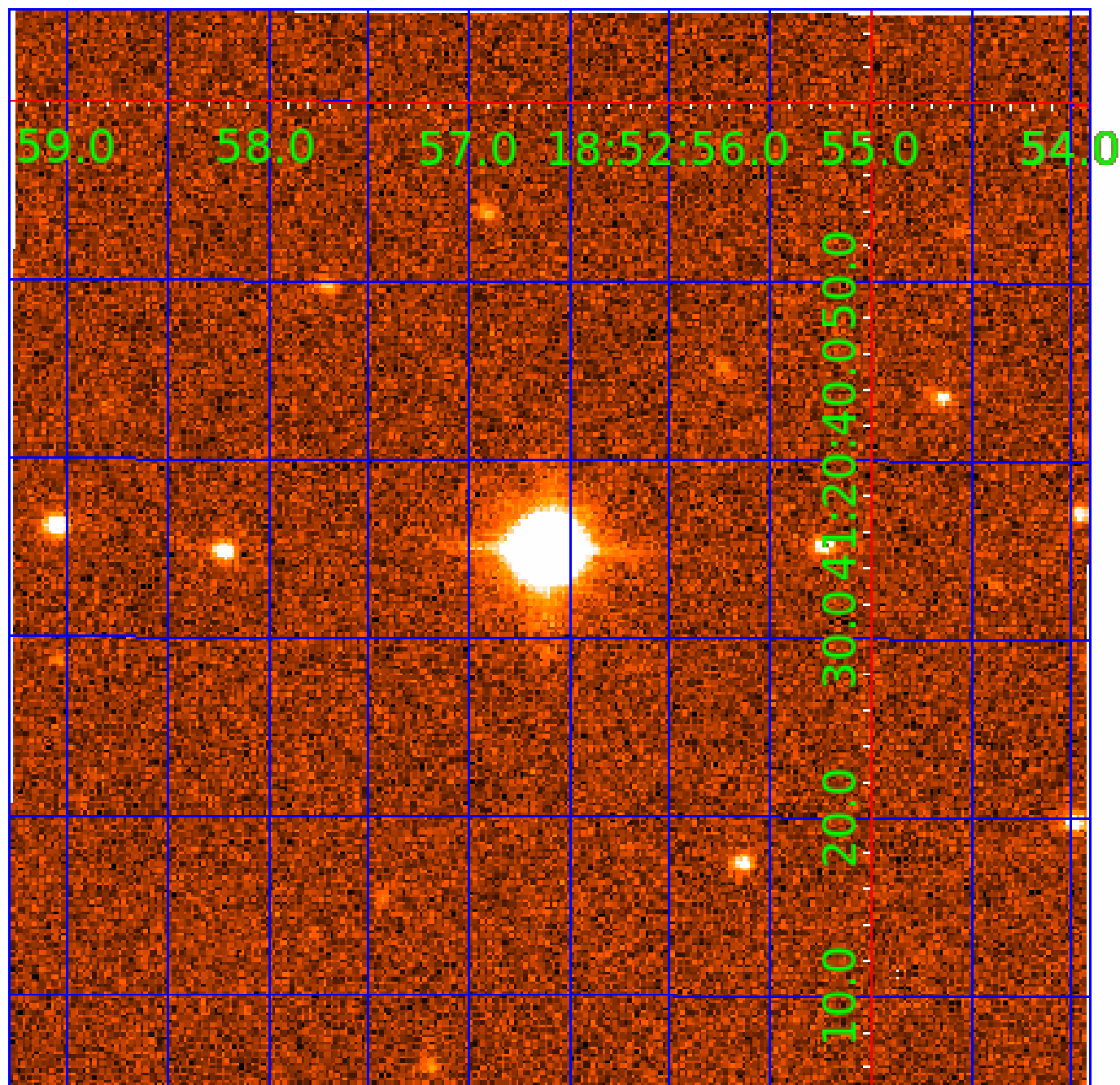


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006021275

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006021275-01	OBS	0284.02	6.414954	137.561375	119.7	3.530	39.2	42.3	1.10	5931	1.49	309.27
006021275-02	OBS	0284.01	18.010222	143.401176	179.4	3.695	33.8	36.5	1.10	5931	1.95	78.09
006021275-03	OBS	0284.03	6.178160	131.795419	99.2	3.323	33.6	36.5	1.10	5931	1.30	325.18
006021275-04	OBS	0284.04	110.286793	239.218122	122.8	4.362	10.0	10.9	1.10	5931	1.37	6.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006021275-01	OBS	PC	0.92	0	0	0	0	NO_COMMENT
006021275-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT
006021275-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006021275-04	OBS	PC	0.84	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006021275-04

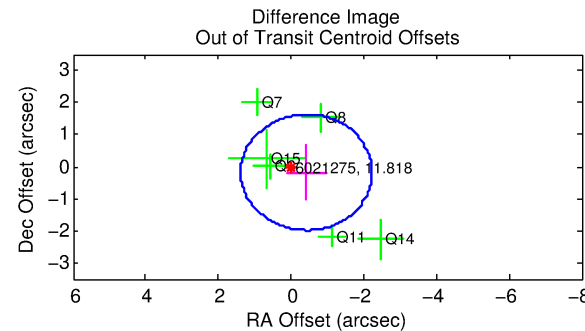
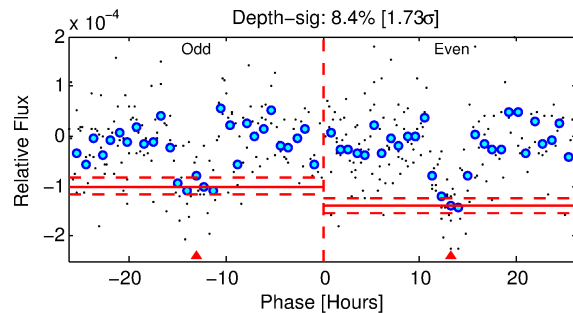
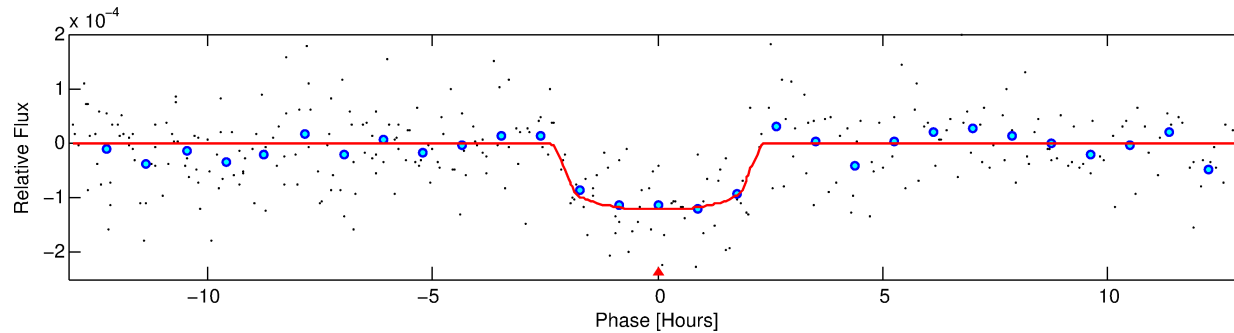
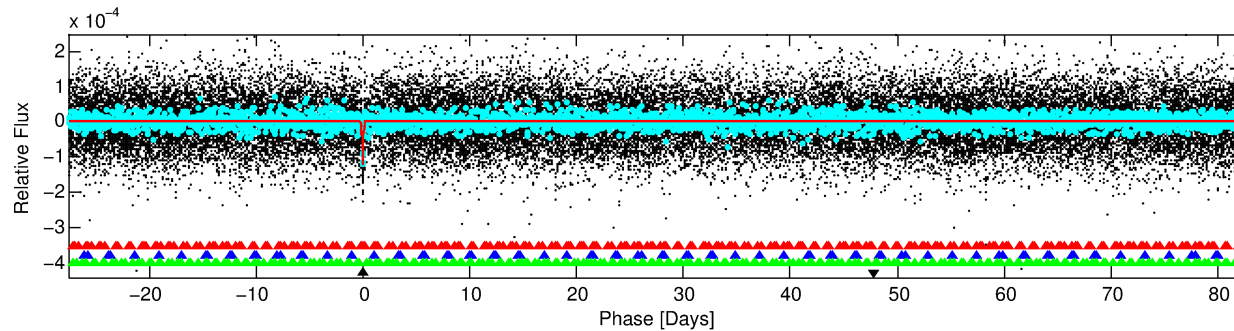
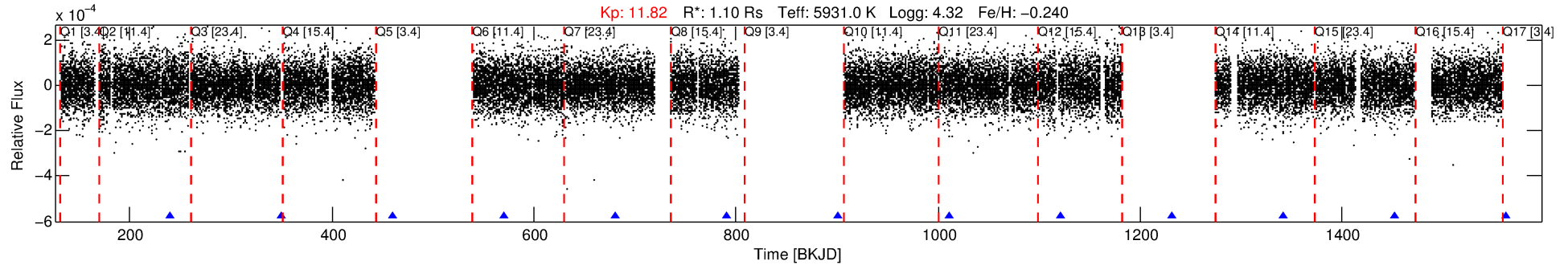
No Significant Match Found



# DV One-Page Summary

KIC: 6021275 Candidate: 4 of 4 Period: 110.287 d

KOI: K00284.04 Corr: 0.990



## DV Fit Results:

Period = 110.28679 [0.00118] d  
Epoch = 239.2181 [0.0067] BKJD  
Rp/R\* = 0.0114 [0.0061]  
a/R\* = 111.41 [291.46]  
b = 0.83 [0.99]  
Seff = 6.97 [1.73]  
Teq = 414 [26] K  
Rp = 1.37 [0.76] Re  
a = 0.4391 [0.0652] AU  
Ag = 1906.26 [2156.56] [0.88 $\sigma$ ]  
Teffp = 4233 [1174] K [3.25 $\sigma$ ]

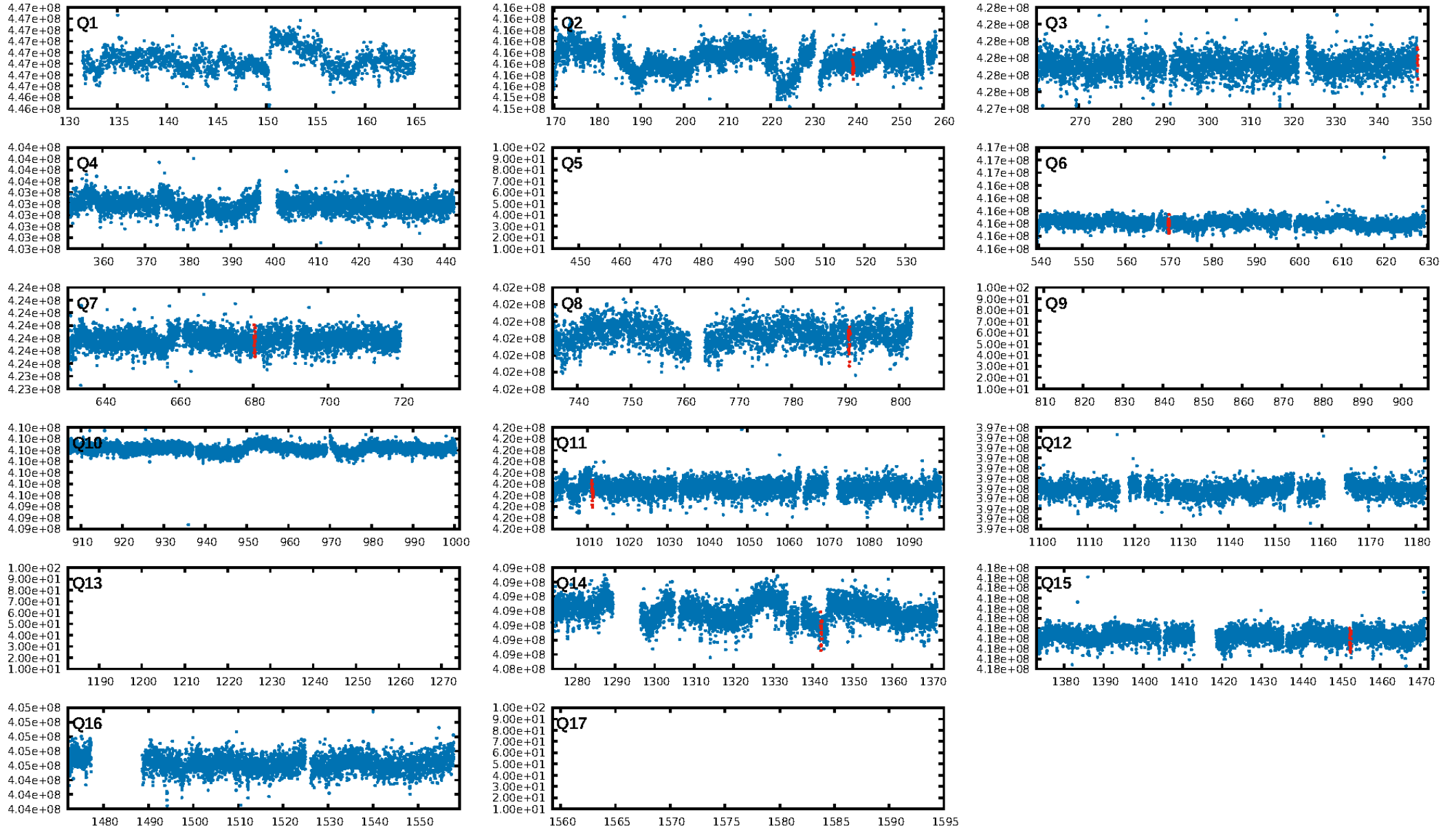
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [387.43 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 95.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.50e-20  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 5.855  
Centroid-sig: 16.7%  
Centroid-so: 1.189 arcsec [1.08 $\sigma$ ]  
OotOffset-rm: 0.454 arcsec [0.75 $\sigma$ ]  
KicOffset-rm: 0.649 arcsec [1.11 $\sigma$ ]  
OotOffset-st: 2/3/1/0 [6]  
KicOffset-st: 2/3/1/0 [6]  
DiffImageQuality-fgm: 1.00 [6/6]  
DiffImageOverlap-fno: 0.71 [5/7]

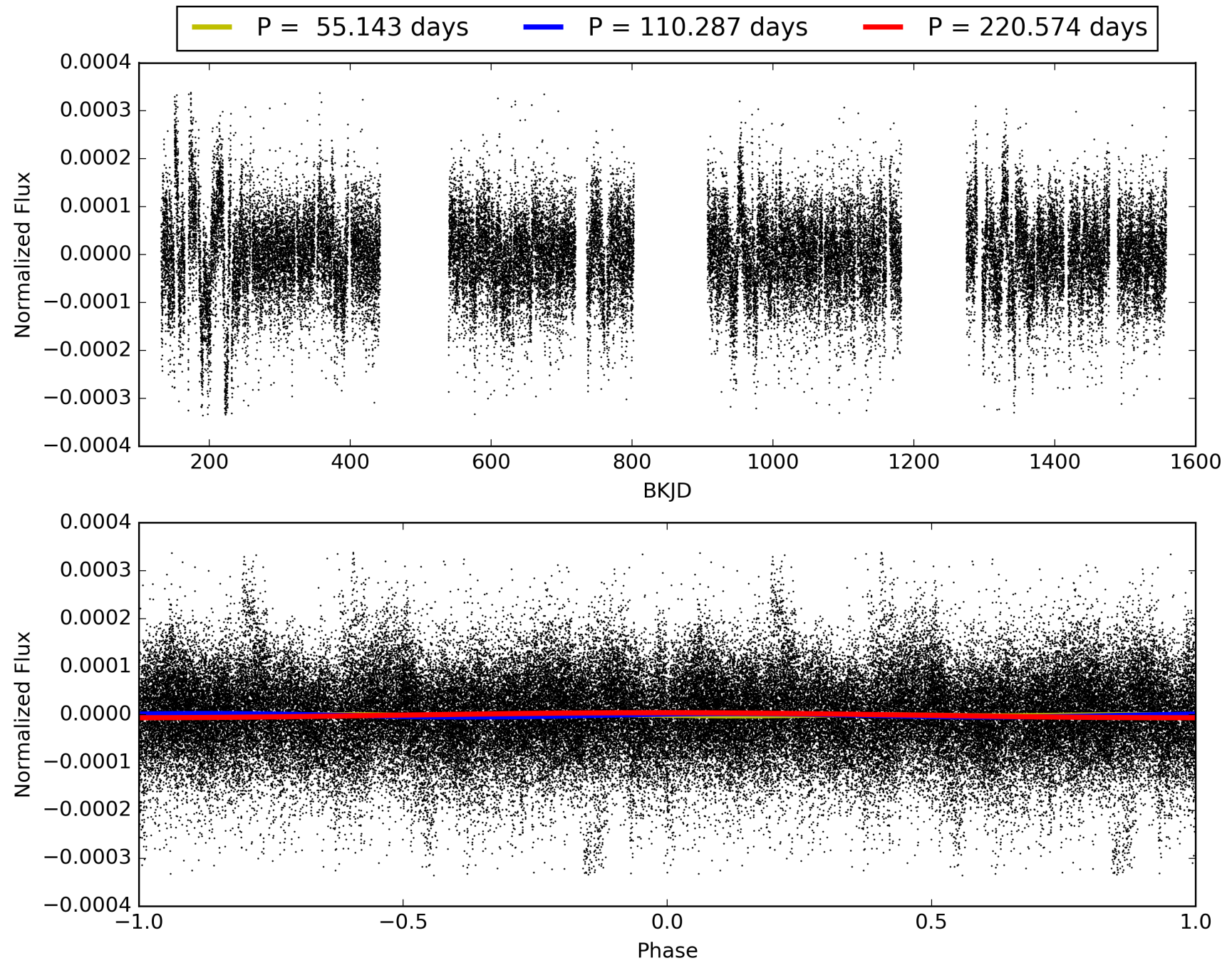
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 14:10:35 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006021275-04, PDC Light Curves

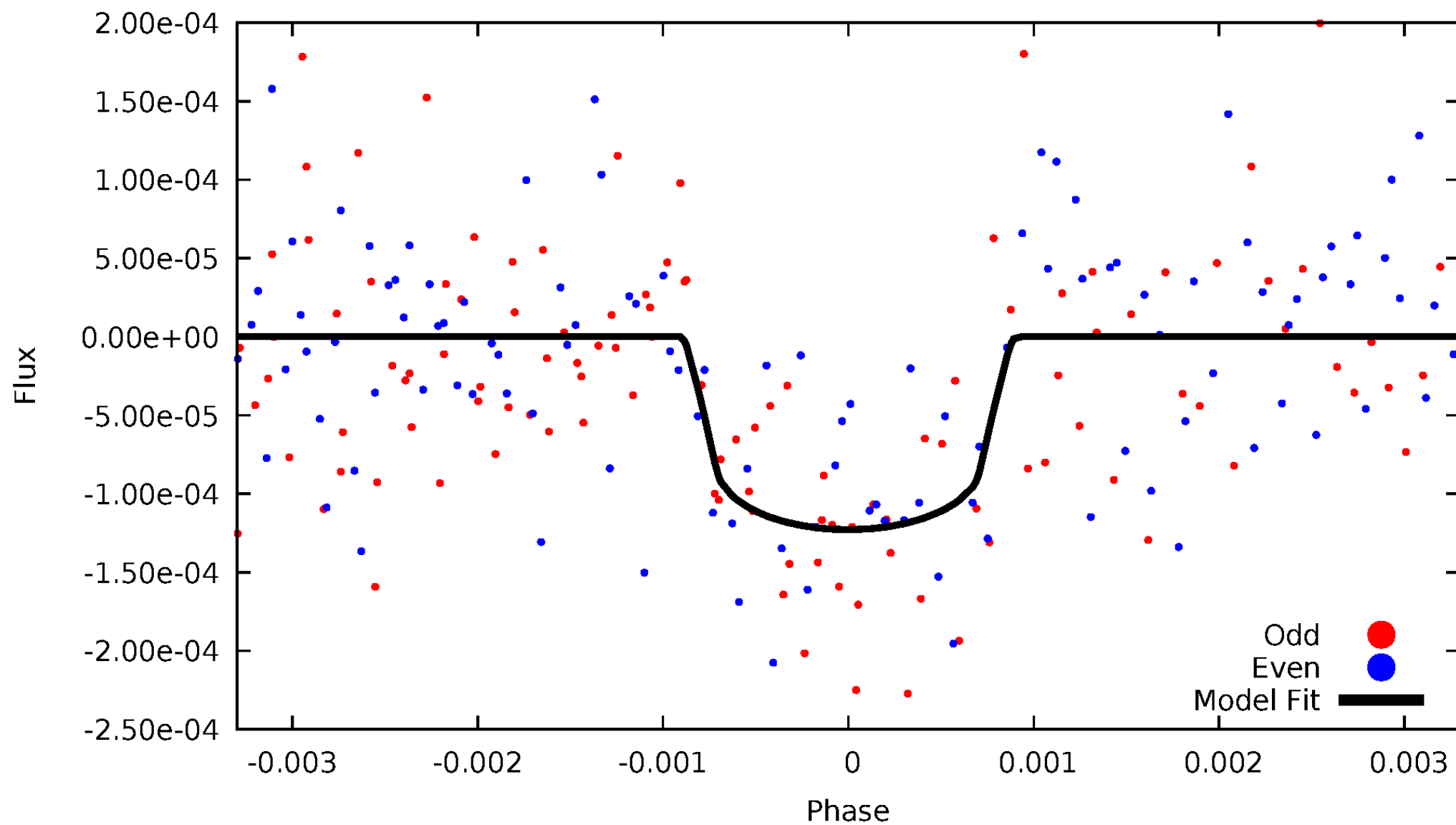


TCE 006021275-04



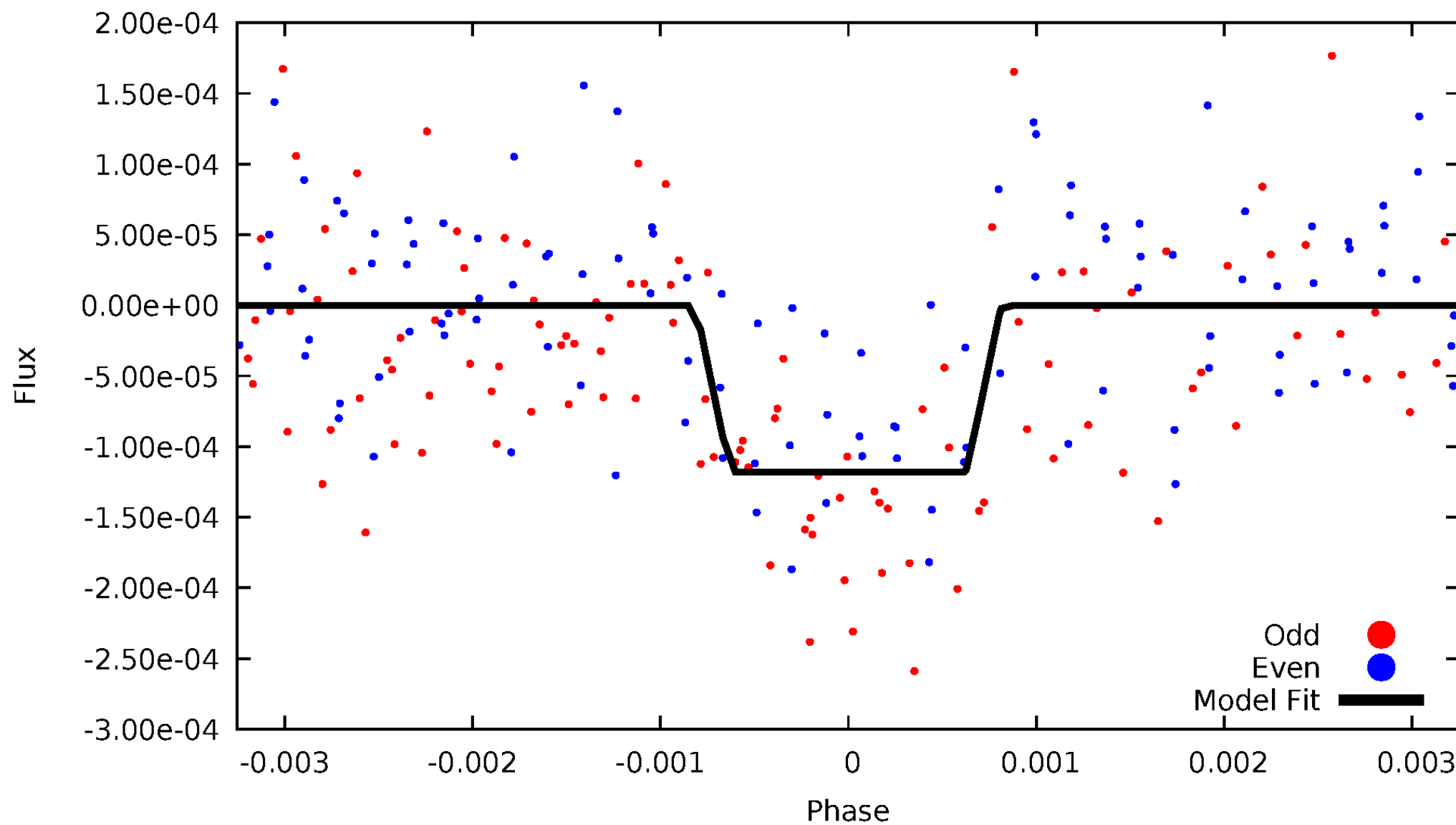
# DV Odd/Even

TCE 006021275-04



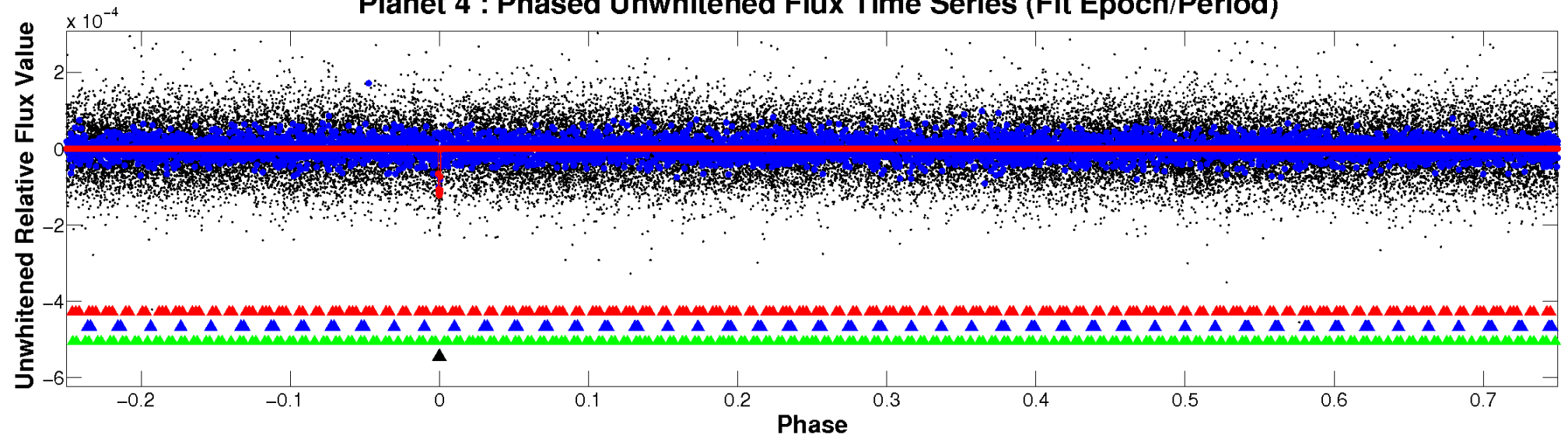
# ALT Odd/Even

TCE 006021275-04

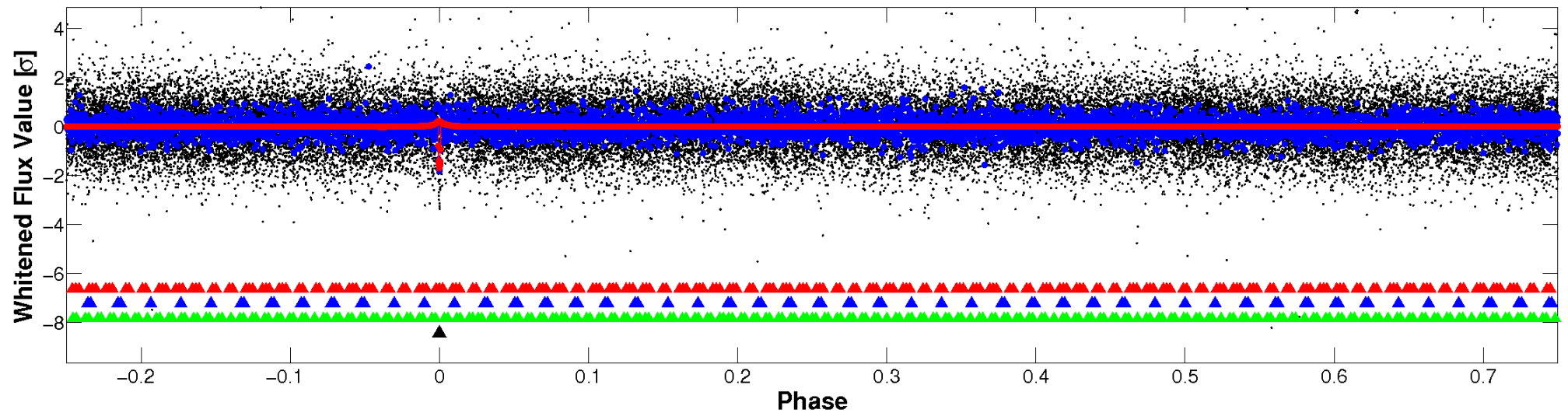


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



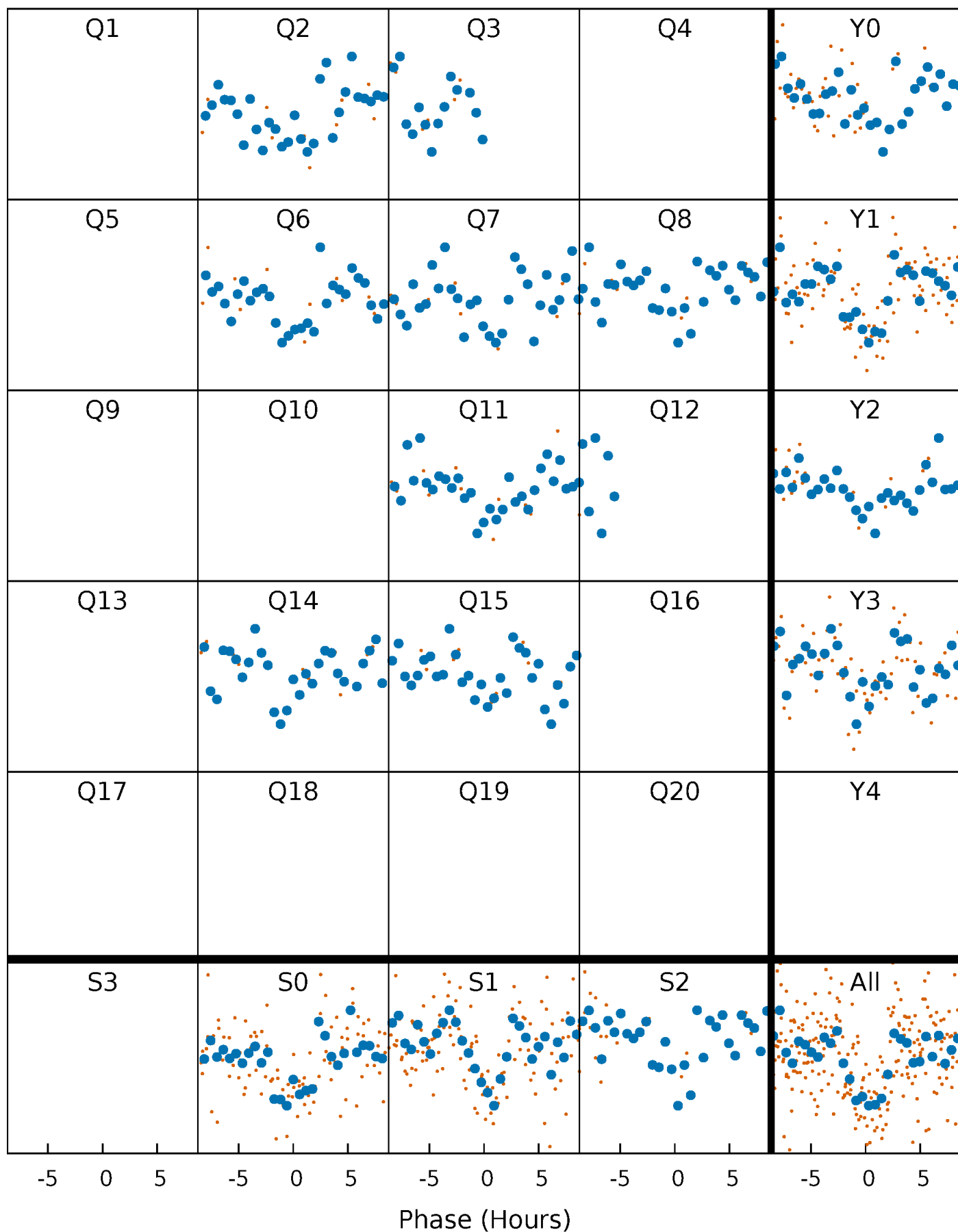
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

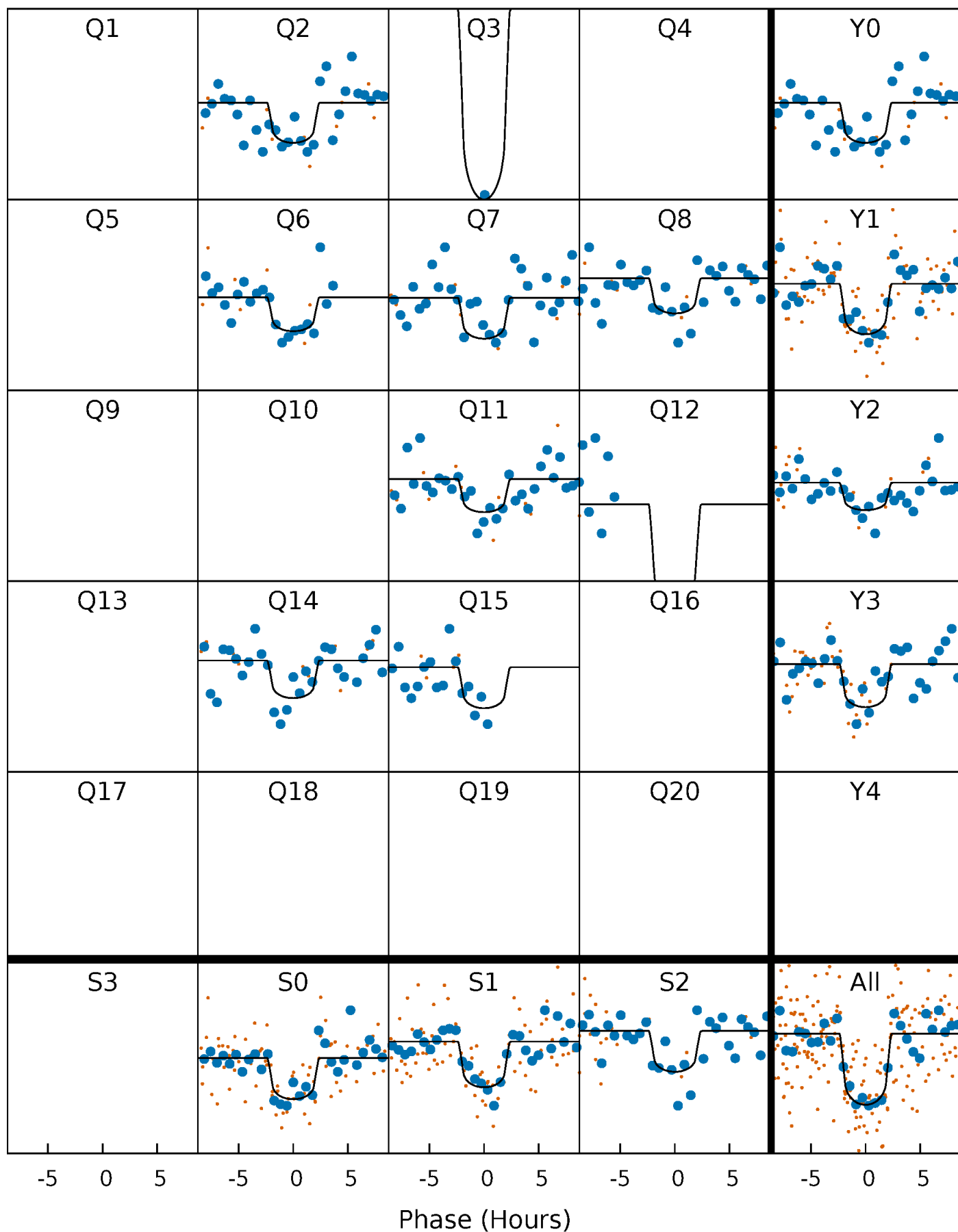
TCE 006021275-04 P=110.286793 Days  $T_0=239.218122$  (BKJD)





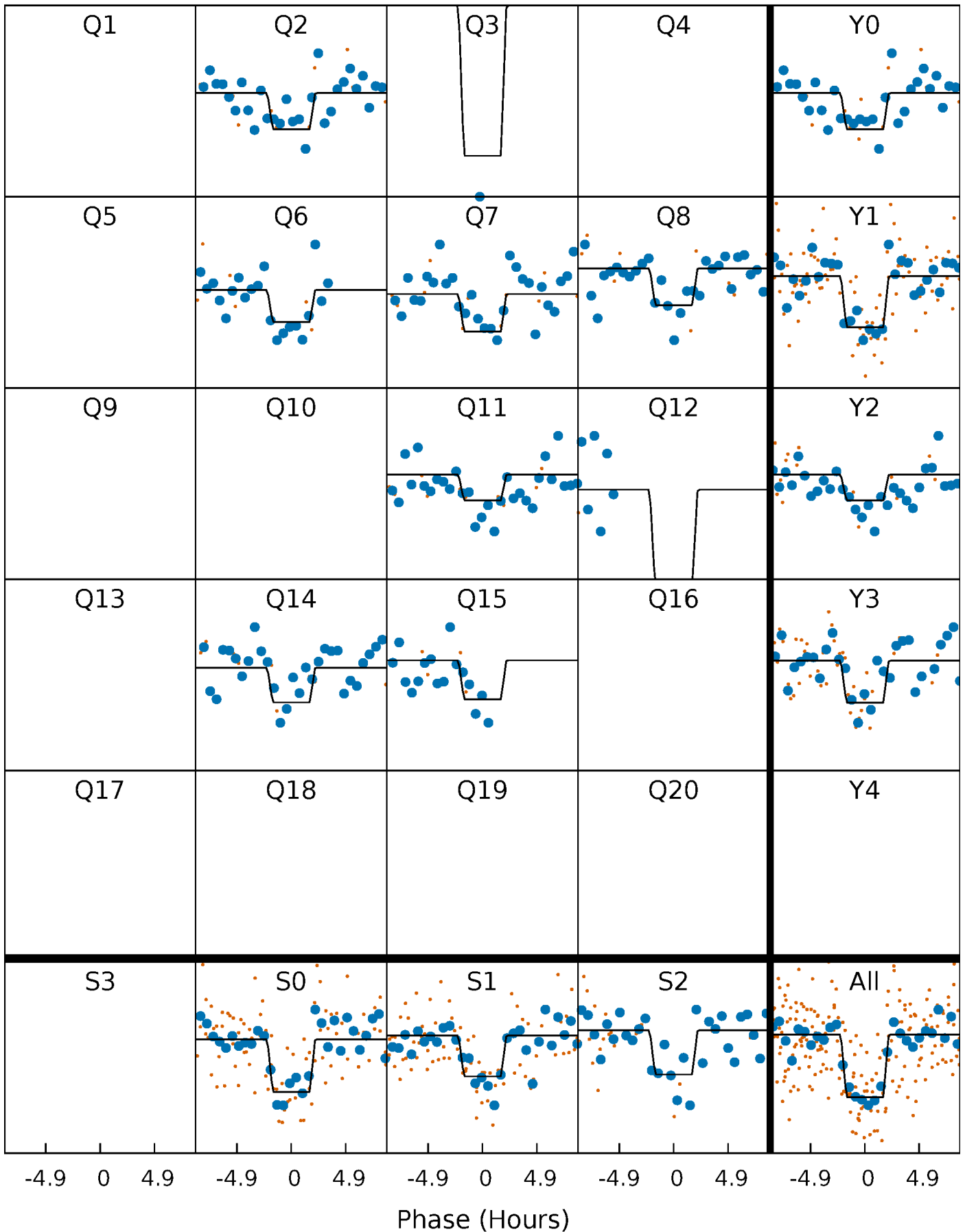
# DV Quarter-Phased Transit Curves

TCE 006021275-04 P=110.286793 Days  $T_0=239.218122$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

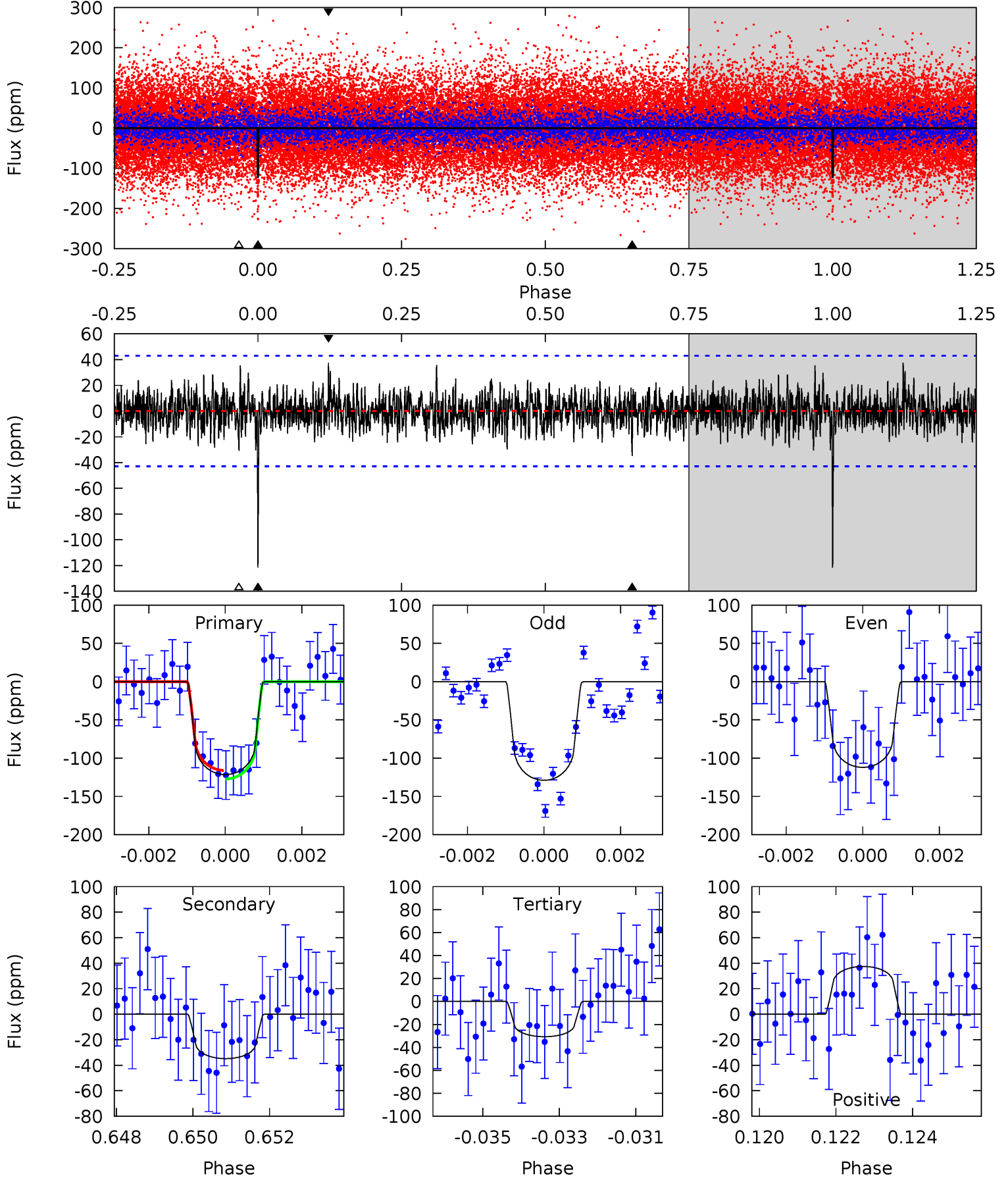
TCE 006021275-04 P=110.284154 Days  $T_0=239.233238$  (BKJD)



# DV Model-Shift Uniqueness Test

006021275-04, P = 110.286793 Days, E = 128.931329 Days

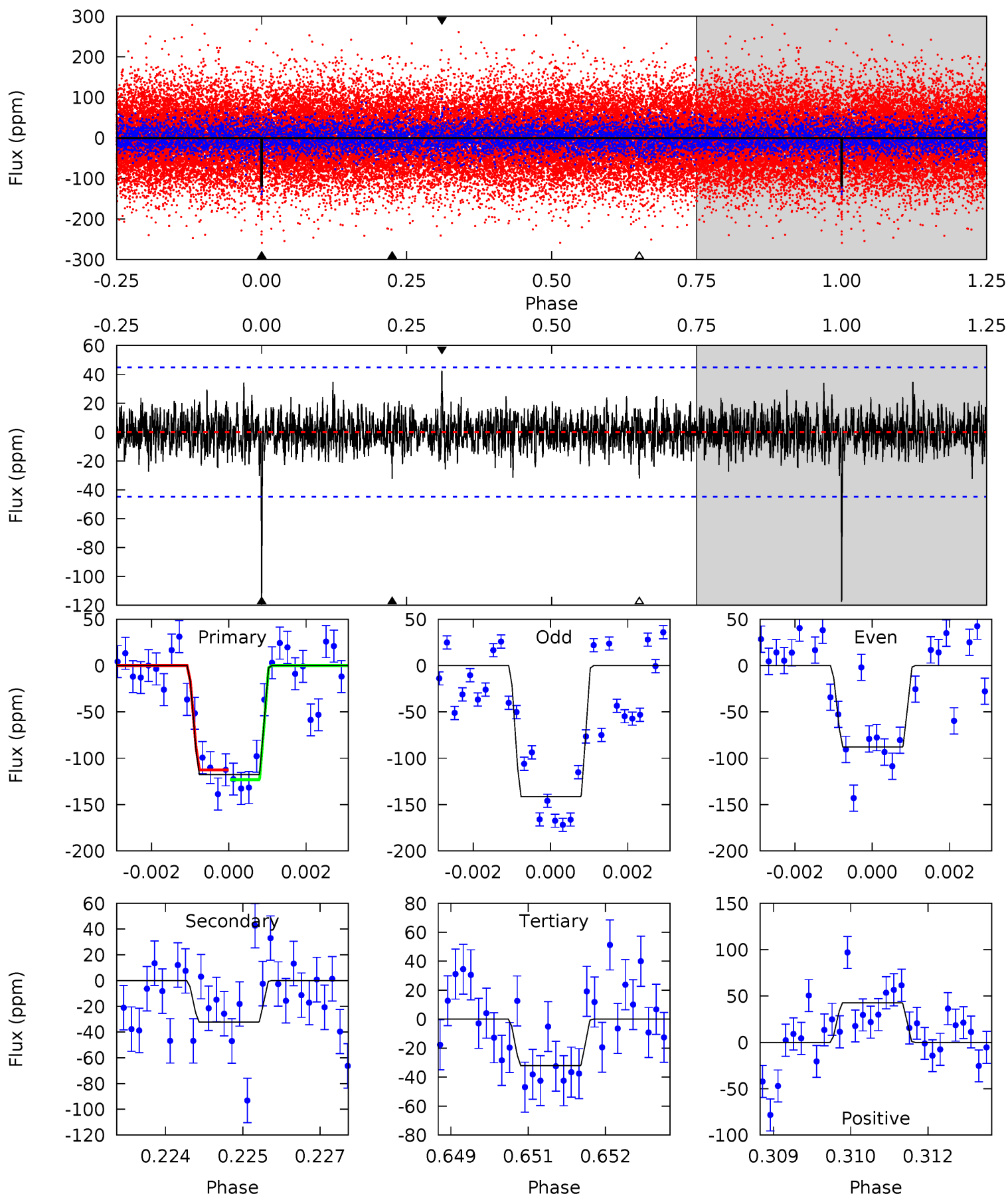
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.1	4.34	3.82	4.66	5.34	3.12	1.19	11.3	10.5	0.52	-0.33	1.05	0.96	0.24	0.70



# Alt Model-Shift Uniqueness Test

006021275-04, P = 110.284154 Days, E = 128.949084 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	3.85	3.84	5.09	5.37	3.16	1.07	10.2	8.99	0.01	-1.24	3.19	0.97	0.27	0.63



### Stellar Parameters For KIC 006021275

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5931^{+107}_{-118}$	$4.322^{+0.137}_{-0.112}$	$-0.240^{+0.150}_{-0.150}$	$1.101^{+0.157}_{-0.173}$	$0.929^{+0.066}_{-0.066}$	$0.980^{+0.606}_{-0.319}$
	+2%/-2%	+3%/-3%	+62%/-62%	+14%/-16%	+7%/-7%	+62%/-33%
Source	SPE59	SPE59	SPE59	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006021275-04 / KOI 0284.04

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-35 \pm 8$	$1.40^{+0.77}_{-0.72}$	$578^{+27}_{-26}$	$4377^{+1541}_{-629}$	$1822^{+5820}_{-1032}$
Alt.	$-32 \pm 8$	$1.31^{+0.75}_{-0.64}$	$578^{+27}_{-28}$	$4429^{+1417}_{-651}$	$1926^{+5788}_{-1158}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

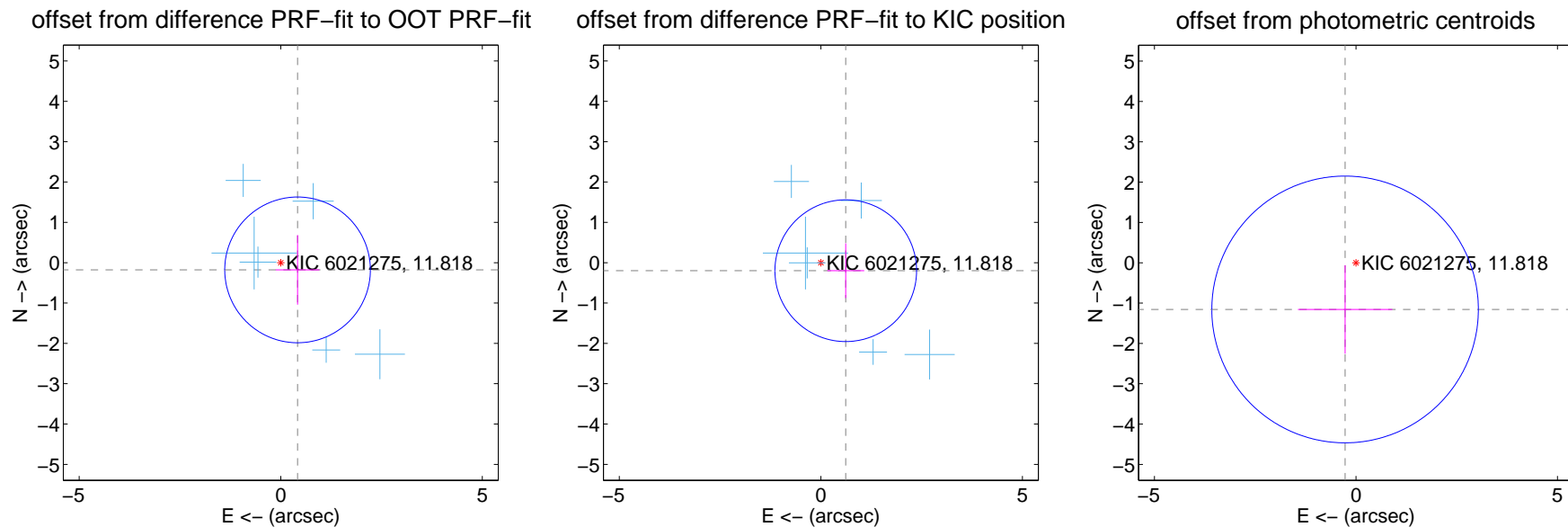
## DV Centroid Data

Supplemental centroid analysis for 006021275-04. **Kepler magnitude: 11.82.** Transit SNR 10.94

There are 6 quarters with good PRF difference image offsets

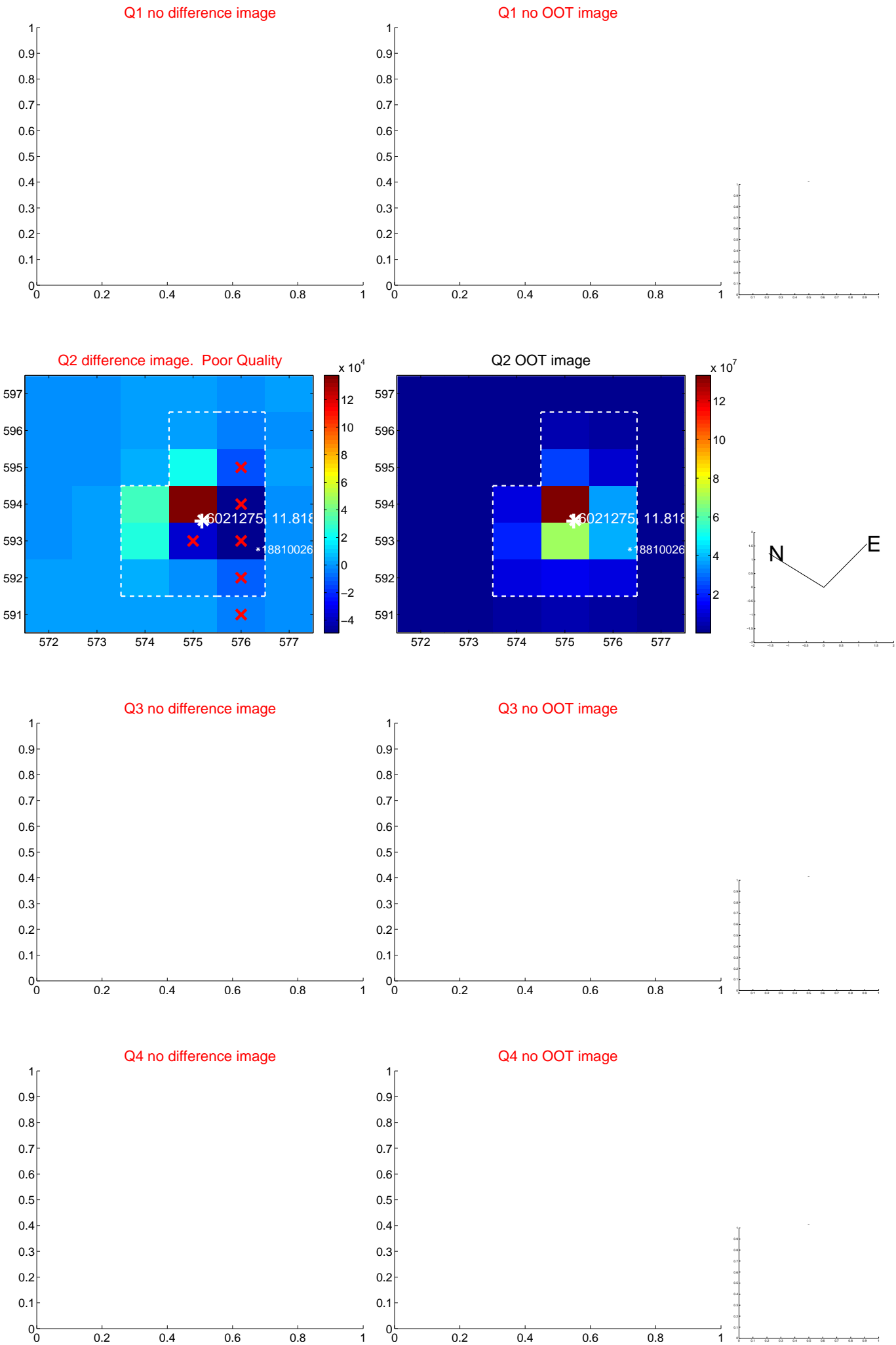
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.454 \pm 0.602$	0.75	$-0.417 \pm 0.541$	$-0.178 \pm 0.863$
PRF-fit source offset from KIC position	$0.649 \pm 0.586$	1.11	$-0.618 \pm 0.458$	$-0.199 \pm 0.678$
photometric centroid source offset	$1.19 \pm 1.10$	1.08	$0.27 \pm 1.17$	$-1.16 \pm 1.10$



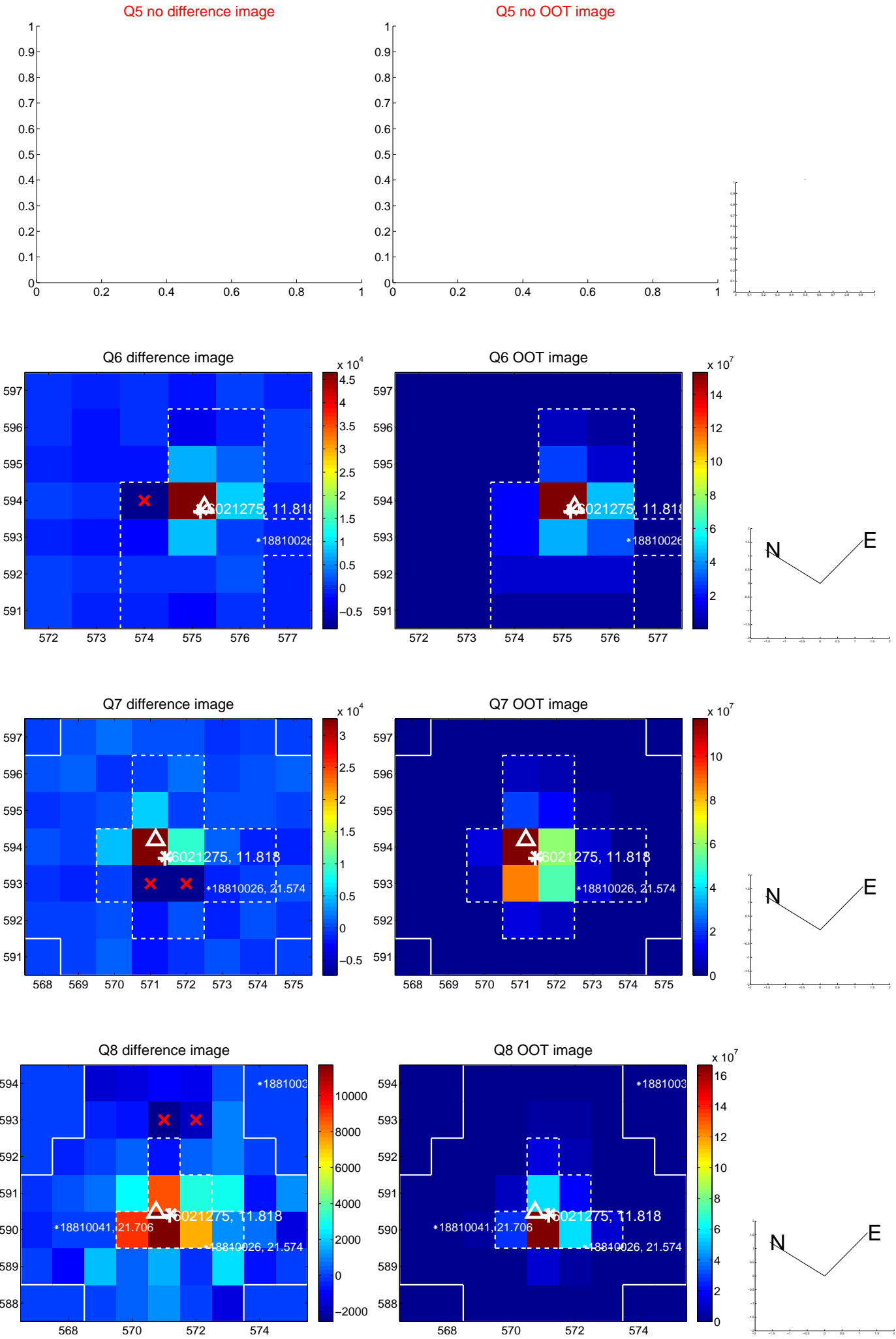
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

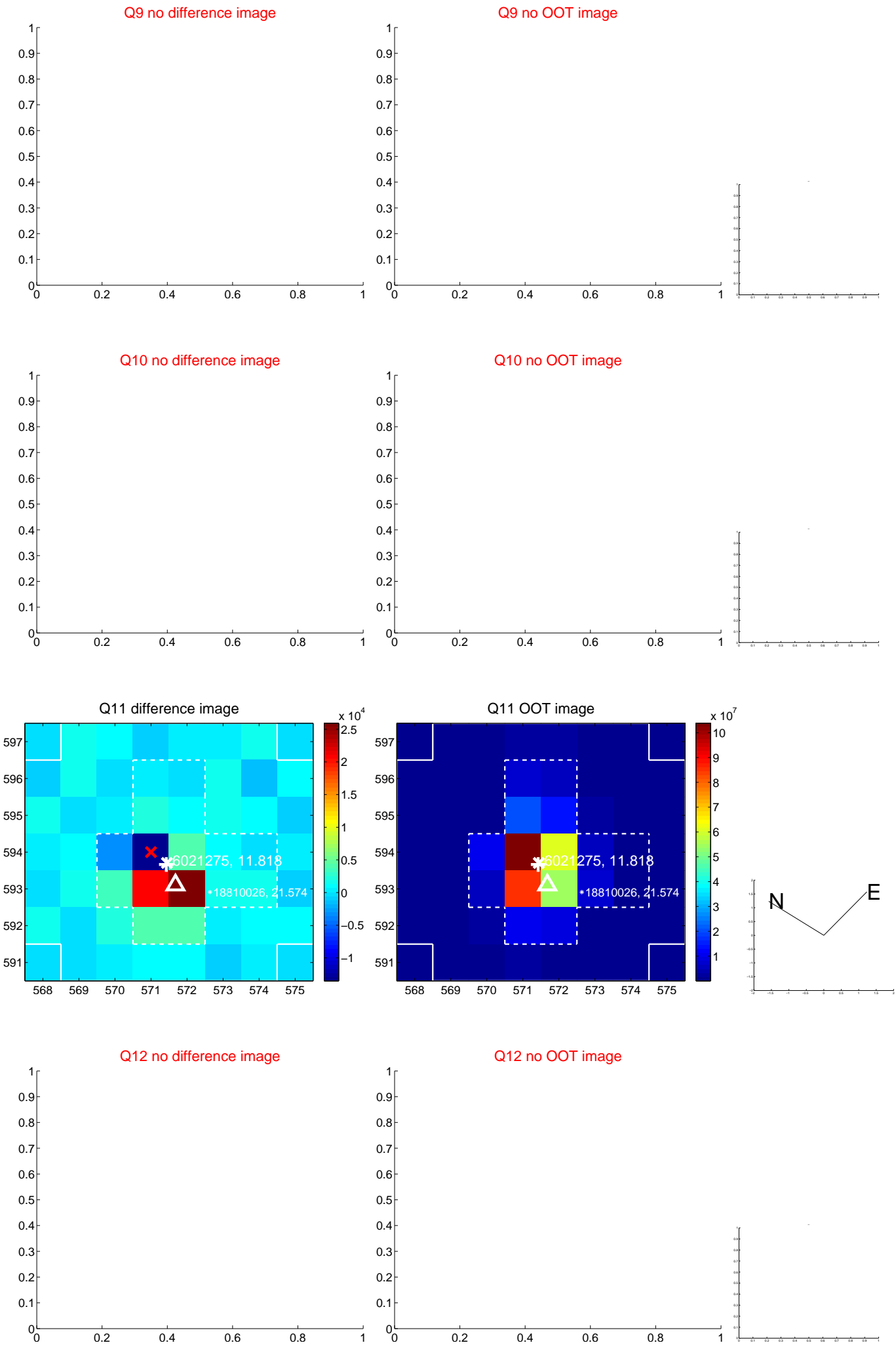




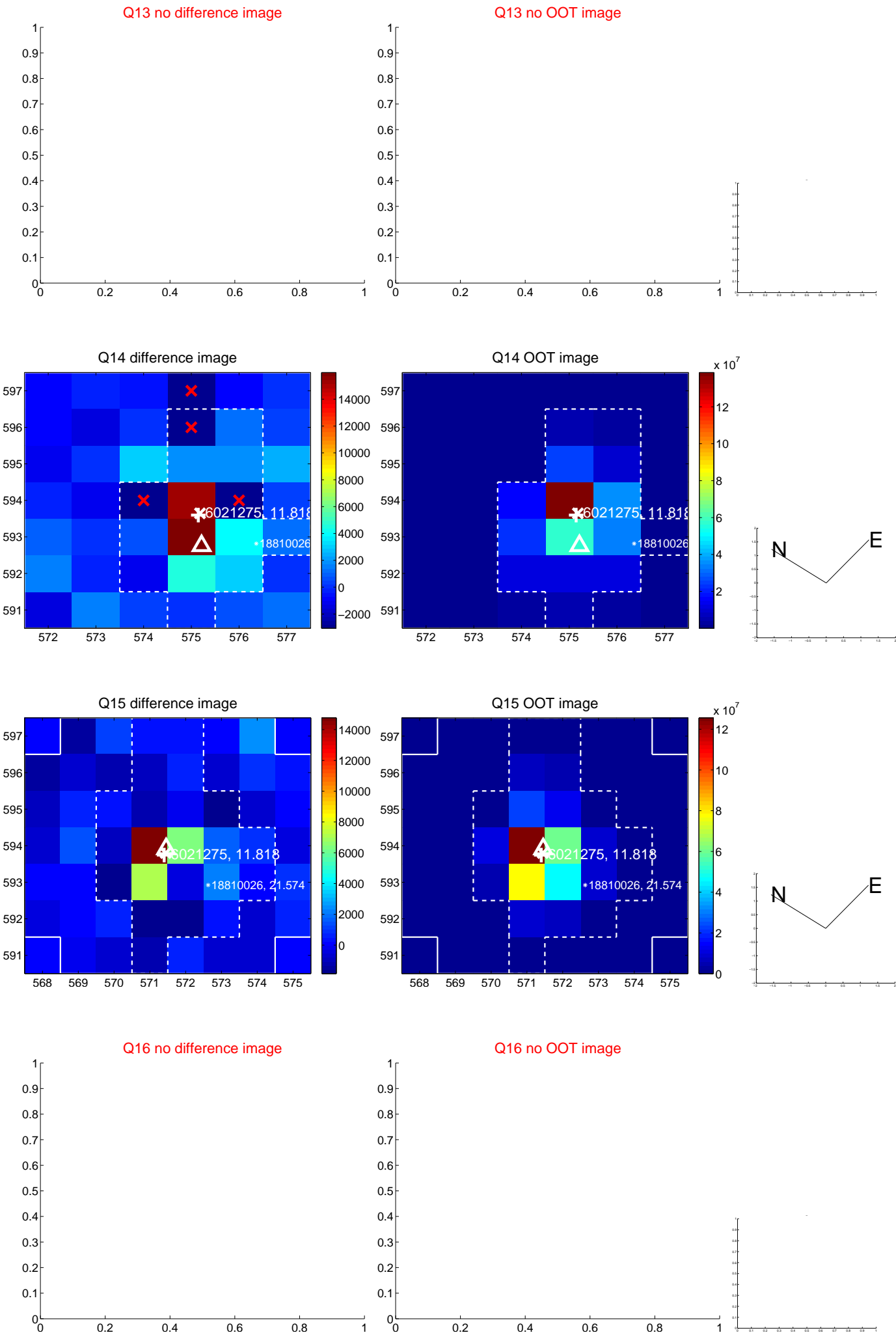
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



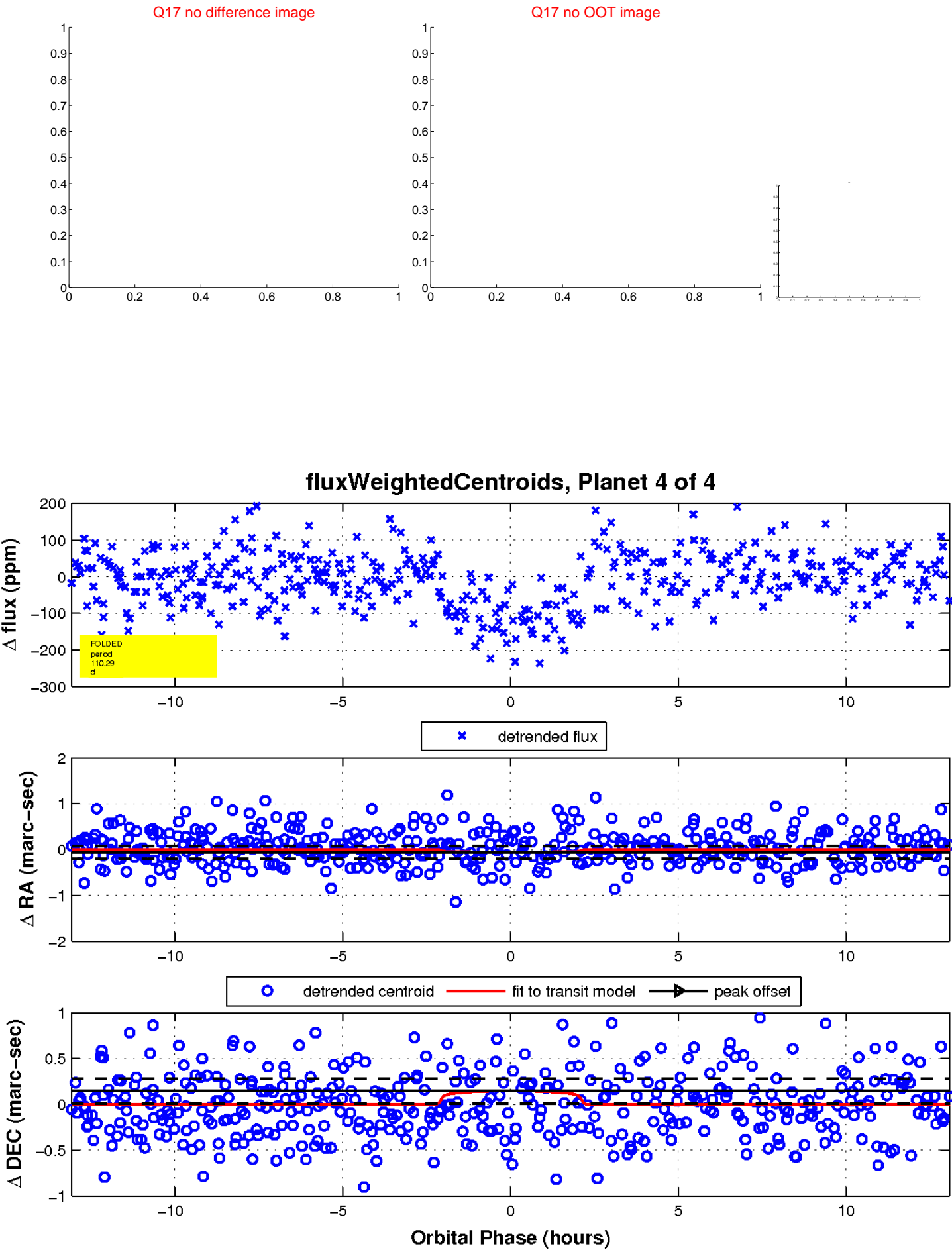
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

